GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

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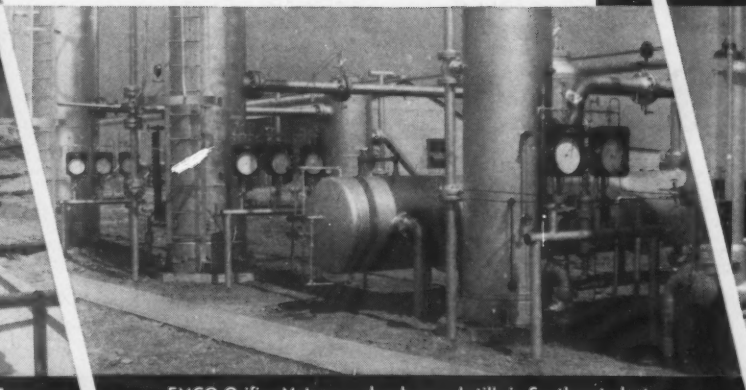
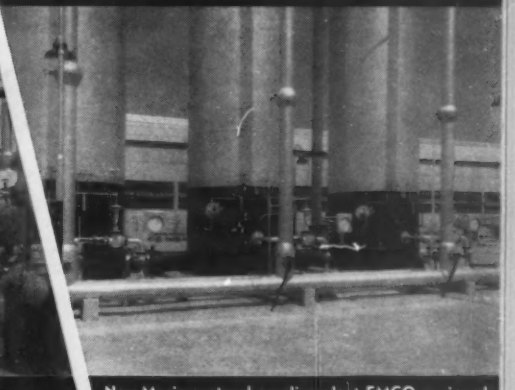
EMCO ORIFICE METERS

Manifold of EMCO meters, gas lift header service, in California

EMCO Orifice Meters at repressuring station in Texas



EMCO Orifice Meters on absorbers and stills in Southwest plant



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California "trap farm" equipped with EMCO Orifice Meters

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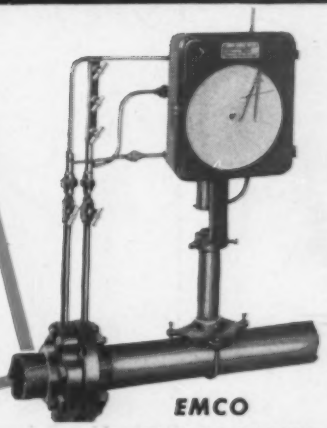

EMCO ORIFICE METER

PITTSBURGH EQUITABLE METER COMPANY

NEW YORK BROOKLYN DES MOINES MEMPHIS OAKLAND TULSA CHICAGO BOSTON

MERCO NORDSTROM VALVE COMPANY
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Black Construction Co.	—
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Burrell, George A.	72
Carbide & Carbon Chemicals Corp.	69
Cast Iron Pipe Research Association	8, 9
Clark Bros., Inc.	—
The Cleveland Trencher Co.	67
Connelly Iron Sponge & Governor Co.	18
The Cooper-Bessemer Corp.	4, 5
Columbia Gas & Electric Co.	61
Cribben & Sexton Co.	—
Dearborn Chemical Co.	—
Dresser Manufacturing Co.	12
Fisher Governor Co.	—
The Fluor Corp., Ltd.	10
General Controls	52
General Gas Light Co.	59
Graver Tank & Manufacturfing Co., Inc.	14
Greenlee Tool Co.	58
H-M Regulator Co.	56
H-M Thermo Control Co.	56
Handbook Butane-Propane Gases	—
Houston Pipe Line Co.	—
Ingersoll-Rand	Third Cover
Jacobs Wind Electric Co., Inc.	—
Johns-Manville	71
Jones & Laughlin Steel Corp.	—
Kitson Co.	68
I. C. Little	—
Merco Nordstrom Valve Co.	—
Lee B. Mettler Co.	54
Milwaukee Gas Specialty Co.	70
Minneapolis-Honeywell Regulator Co.	Fourth Cover
Mueller Co.	64
National Tube Co.	Second Cover
Natural Gas Odorizing Co.	—
Pacific Coast Gas Association	60
Pacific Gas & Electric Co.	65
Pacific Meter Works	—
Payne Furnace & Supply Co.	55
Pittsburgh Equitable Meter Co.	Front Cover
Reliance Regulator Corp.	13
Republic Steel Corp.	—
Reynolds Gas Regulator Co.	71
Robertshaw Thermostat Co.	—
Geo. D. Roper Corp.	63
Seattle Gas Co.	72
Semet-Solvay Engineering Corp.	66
Servel, Inc. (Servel Electrolux)	50, 51
Sharples Chemicals, Inc.	1
M. B. Skinner Co.	11
A. O. Smith Corp.	—
Sonken-Galamba Supply Co.	—
Spencer Thermostat Co.	64
Sprague Meter Co.	16
Union Carbide & Carbon Corp.	69
United Gas Pipe Line Co.	—
U. S. Pipe & Foundry Co.	15
United States Steel	Second Cover
Vulcan Proofing Co.	17
Walworth	3
Webster Engineering Co.	68
Williams Brothers Corp.	—
Worthington Pump & Machinery Corp.	7
John Zink Co.	53

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Nineteenth Year of Publication

Contents for May, 1943

GUEST EDITORIAL: Perhaps We Can Do It Ourselves—*By Clifford Johnstone* 19

Thermally Thinking—*By Elliott Taylor* 21

GENERAL AND FEATURE ARTICLES

WAR CONFERENCE REPORTS:

Natural Gas Industry War Problems—*By Burt R. Bay* 23

Teaching the Customer to Help Himself—*By Donald S. Bittinger* 25

The Future of Natural Gas Derivatives—*By K. S. Adams* 28

Effect of Camouflage Painting on the Temperature of Plant Equipment—*By Oliver W. Johnson* 30

Gas Heating Cabinet Dries Plane Engines in Four Hours—*By E. H. Adler* 33

Gas Holder Corrosion—*By M. Frank Knoy* 34

The Wartime Tasks of Industrial and Commercial Gas (A Symposium):

6. Small Air Conditioning Installations—*By George Elmer May* 37
7. Electrolytic "Detearing" Process—*By Harold P. Ransburg* 38
8. Outlook for the Post-war Period—*By C. V. Sorenson* 39

Briefs of Washington Orders 40

Natural Gas Management Conference 41

Accountants Hold Cincinnati Meeting 44

Service, Maintenance, and Manpower Problems Feature AGA Distribution Meeting 45

Whitlaw Confirmed as AGAEM Director 46

Bi-monthly Billing of Heating Customers—*By C. G. Alder* 49

An Overhead Heater Used in England 62

Gas Heat Treating at Link-Belt Co. 66

DEPARTMENTS

Associations	41	Obituaries	60
People	56	Products	64

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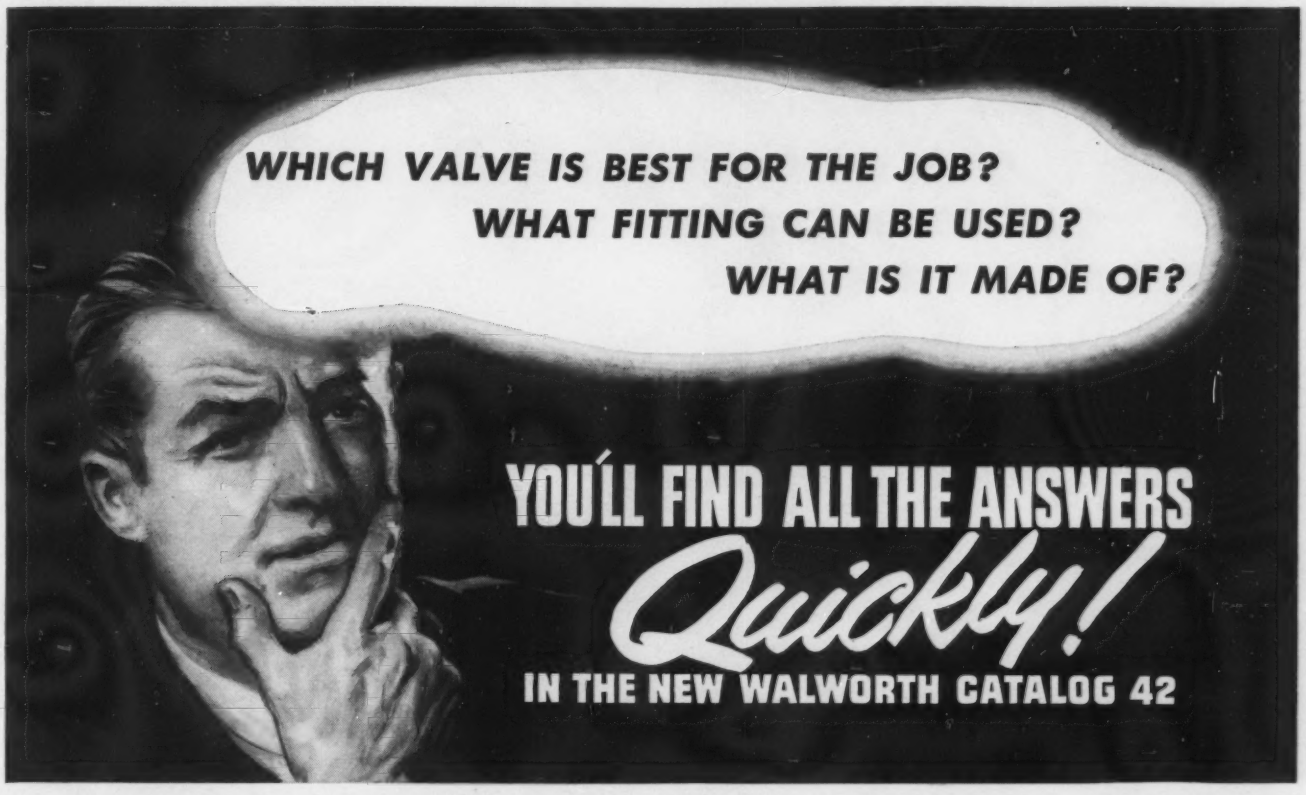
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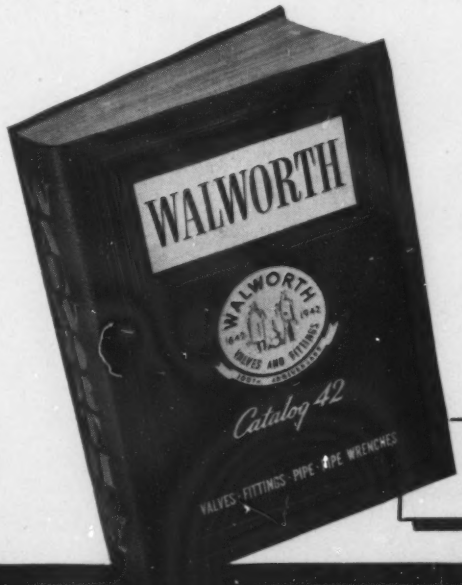

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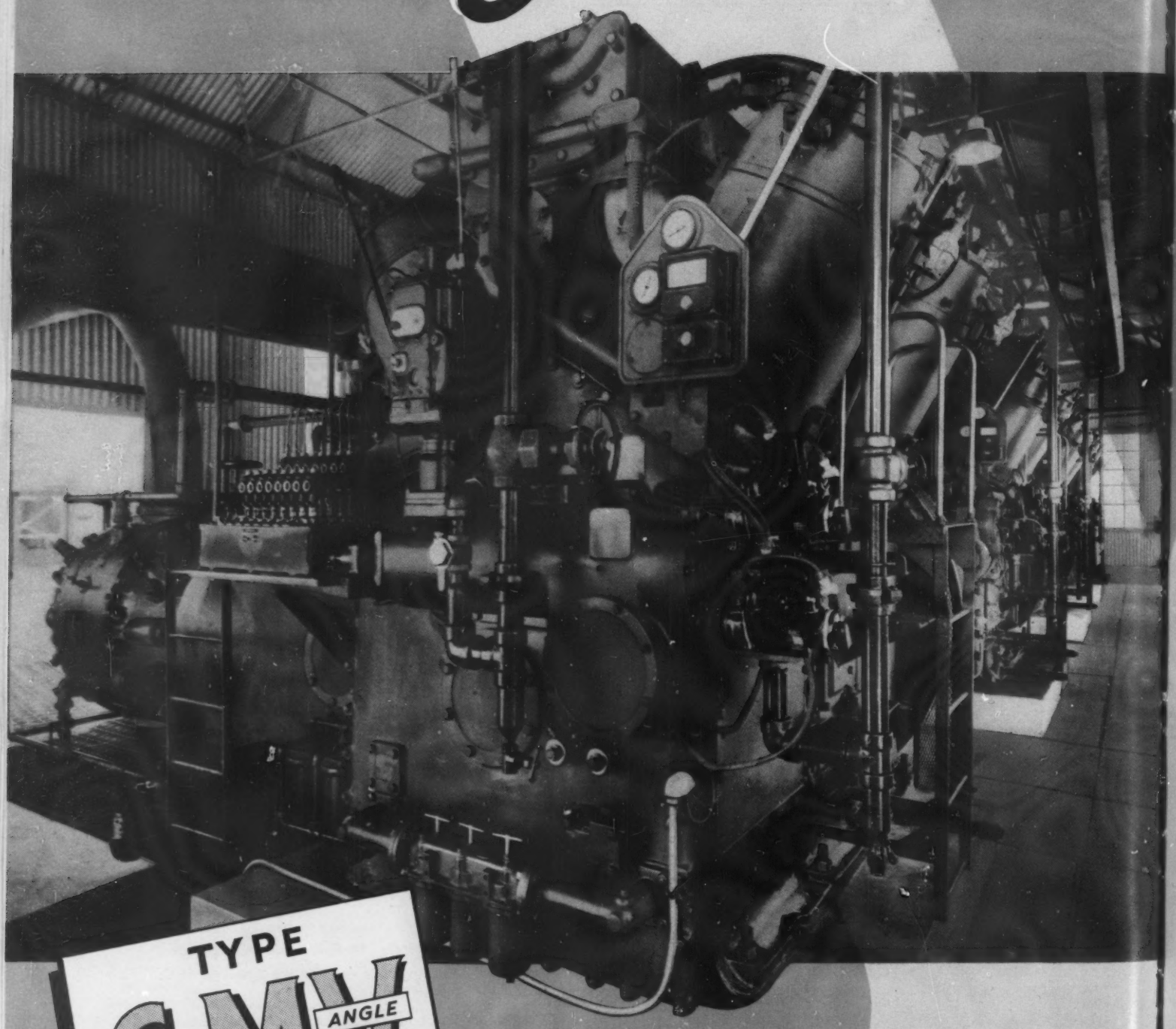

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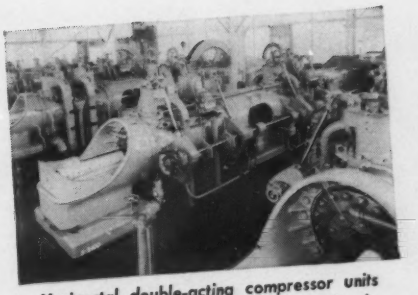

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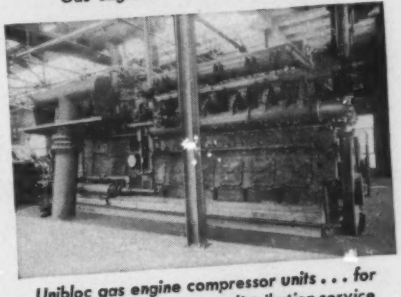
Angle compressor units . . . for main line, booster and distribution service, in medium capacities

Gas engines for auxiliary station service



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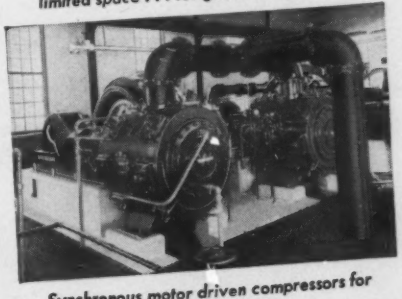

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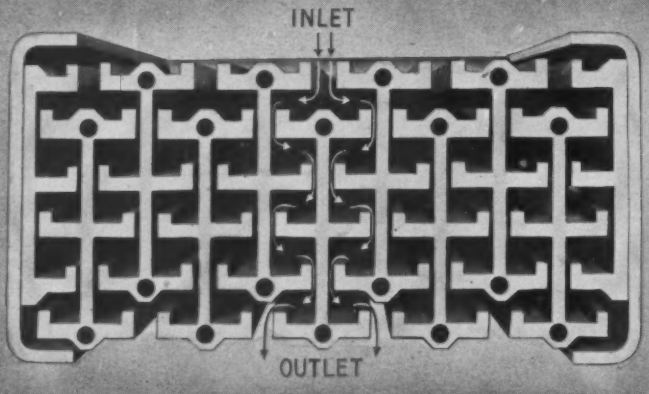
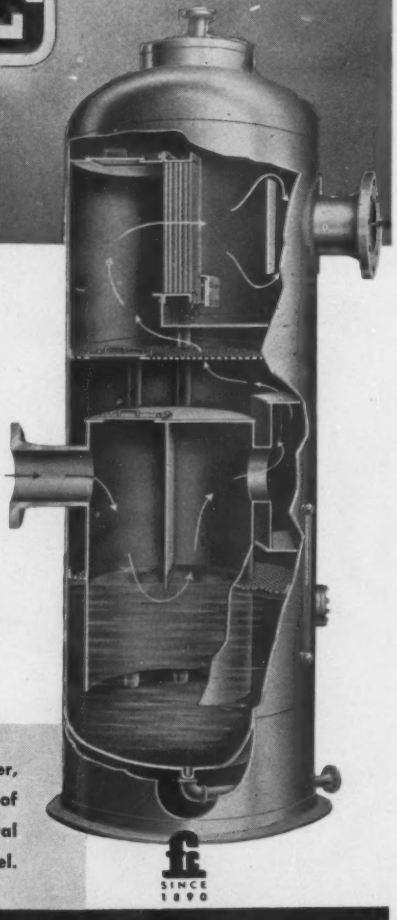
New separator unit knocks out gas-entrained liquids and solids





THE HEART of the new Fluor Gas Cleaners is the separator element, shown above. These scientifically designed baffles say "stop" to entrained liquids and solids in gas streams. All three types of Fluor Cleaners,— the vertical liquid removal type, the horizontal liquid removal type, and the vertical solids removal type,— employ this highly efficient separator.

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The New Fluor Gas Gleaners have been built for a long life and continuous and trouble-free operation. A new Bulletin completely describes and illustrates all 3 models and their operation. Write for your copies today. No obligation.

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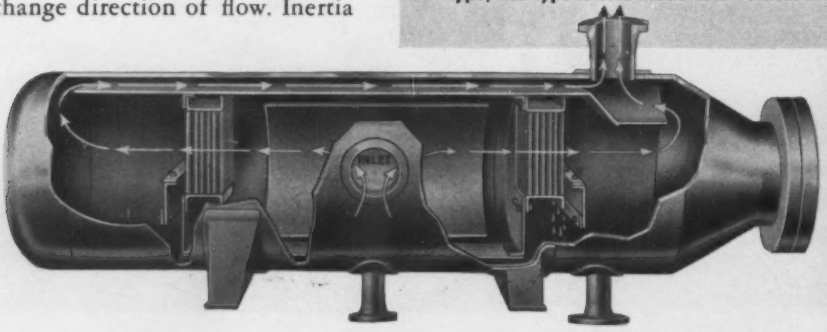
At right: Cutaway view of Fluor Gas Cleaner, Solids Removal Type. Below: Cutaway view of Fluor Gas Cleaner, Horizontal Liquid Removal Type; this type is also made in a Vertical model.



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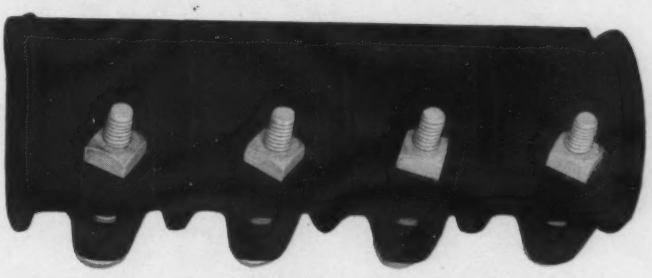

(Double length) SKINNER-SEAL Pipe Line Clamp — Made in sizes 3/4" to 7" O. D. inclusive.

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A check of your stockroom may reveal some Dresser Couplings salvaged from old pipe-lines. Don't let them stand idle. With a new set of gaskets and bolts, they will be ready to go back to work. Dresser can supply the gaskets and bolts on proper priority.

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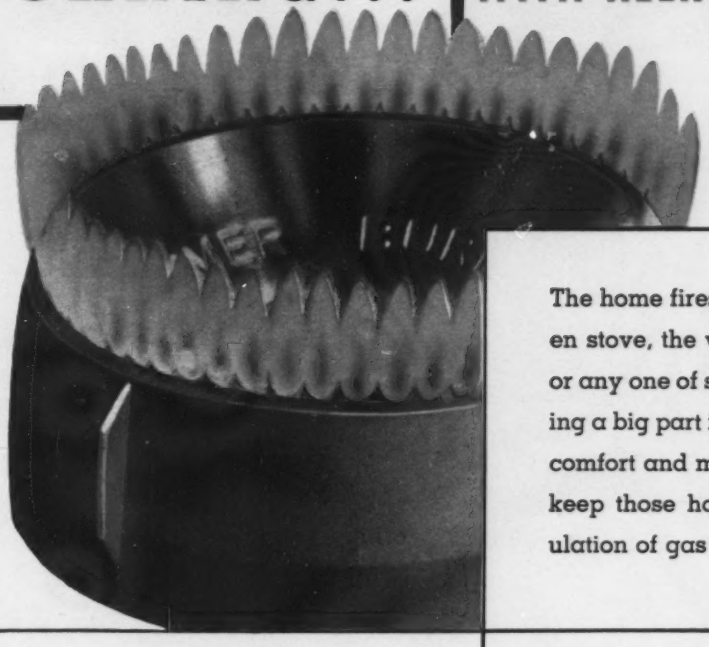
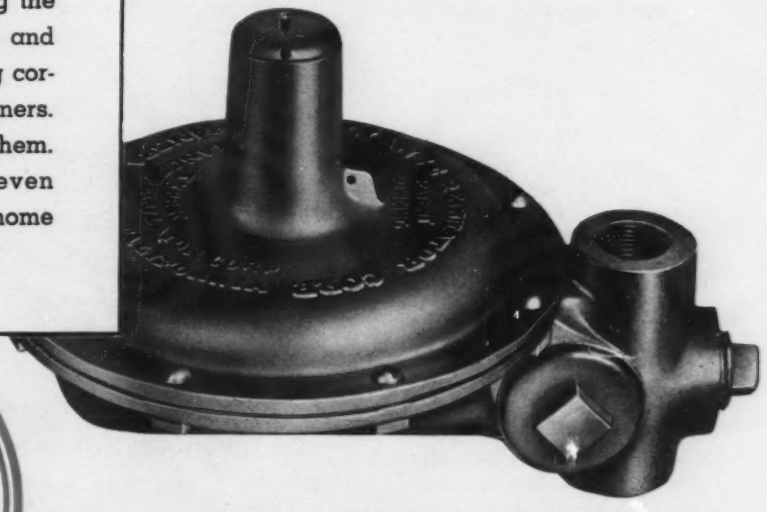
KEEP THE HOME FIRES BURNING... WITH RELIANCE REGULATORS



The home fires—whether they're in the kitchen stove, the water heater, the heating plant or any one of scores of applications, are playing a big part in America's war effort. Health, comfort and morale can be maintained if we keep those home fires burning. Proper regulation of gas pressures will help do the job.

Reliance Gas Regulators are increasing the efficient operation of these appliances and prolonging their service life by insuring correct and uniform pressure for all burners. Install Reliance Regulators and forget them. They stand neglect, exposure and even abuse. Year after year they'll keep the home fires burning—in all installations.



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Connelly IRON SPONGE

"Quenching Towers"
Prize winning photo by
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Company, Chicago

GUEST EDITORIAL

Perhaps We Can Do It OURSELVES!

By CLIFFORD JOHNSTONE

Managing Director,
Pacific Coast Gas Association

MANY years ago a man with a lot of imagination discovered that if he heated coal in a certain way it gave up the ghost and became several other things even more useful to mankind than the original coal. The ghost which was given up was invisible as is usual with ghosts, but it burned very well and the man called it gas.

From such simple beginnings grew the great gas industry and it all goes to show that a man with imagination really has something. The old saying, "Don't start something you can't finish," applies only to fights, and perhaps not even then. In business, in science, and in all real living the man who "starts something" is the guy who drags us up to better things. Plenty of others will do the work.

Everything was rosy for gas until many years later when another man started something. This man discovered that if you turn a gadget wrapped with wires inside another gadget also wrapped with wires, something was produced which would run along a little wire and turn things at the other end, wherever that might be. He called it electricity and the many men who followed proved it really is wonderful stuff and can do most anything. The gas men snickered about it at first, but like the poem says, they endured, then pitied, then embraced. Yes, sir, the gas men went right into the electric business and some got so interested in it they forgot that gas is wonderful, too.

That's the trouble with some people. They have single-track minds. They get so enthusiastic about one thing that it blinds them to everything else. These men who climbed on the electric band wagon were blinded to a lot of things. They forgot that it takes more coal to make electricity than it does to make gas; they forgot that in making electricity they burned up all the coal, while in making gas it was just carved up a bit into a lot of very useful things; they forgot that it's a lot cheaper to build a gas pipeline than to build an electric power line. When these things were pointed out to them they couldn't laugh them off exactly, but they said, "So what! There's lots of coal." Some of them who lived near the big rivers said, "We don't need coal, we'll use water." And they did. They built dams and let the falling water turn the gadgets that made the electricity. This was swell except they found they had to use a lot of coal anyway when the rivers dried up or when they needed a lot of electricity quick. Even with this little trouble it was a grand idea that made the politicians jealous.

It looked too easy, and when politicians think they smell gravy they sure do activate. They said there aren't many rivers, so you boys keep off because these rivers belong to the people. "The people" is what politicians call themselves when they smell gravy. And so the politicians grabbed a lot of the best electric business and are getting more every day. They make a fine showing, charging cost to navigation and operating expenses to taxes.

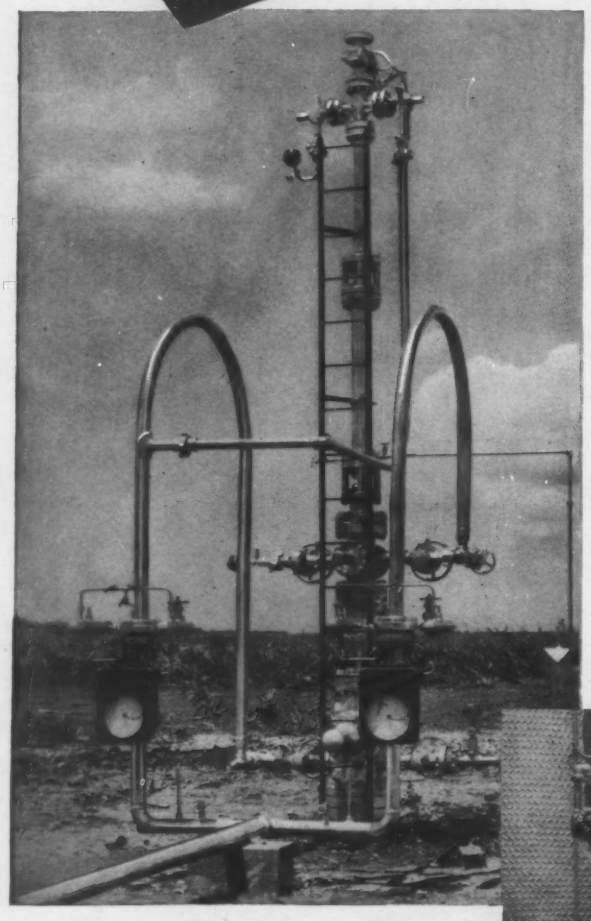
In the meantime the boys who stayed home to run the gas plants were having a tough time. They had a lot of good ideas, too, but the boss was so busy electrocuting he paid them no mind. They got along all right, though, because they could do things so cheap, but they didn't do all the things they might have done if the boss had played ball with them. It was like shooting crap with the other guy's dice or having your shop in back of your competitor's showroom. The gas men who didn't have an electrified boss had a tough time. They were so few they hadn't money enough to do big research or national advertising.

That's about where we stand today and it's about time for some guy with imagination to come along and start something. It needn't be anything very big either: just enough to prove that gas is best of all for heat and a lot cheaper than anything else. This guy will probably build his plant at a coal mine or in an oil field. This plant will not be a gas plant at all but a chemical plant with gas just one of its products. He will pipe the gas for perhaps thousands of miles and burn it in enclosed tubes giving off flameless radiant energy just like the sun, and like the sun a brilliant daylight, too. He will have tiny water heaters for each faucet, and will have the range fixed so that each of its functions can be placed and used separately if need be. All will be served through pipes no bigger than an electric wire. He will provide big noiseless refrigerators and a little box that will heat and cool each room just to taste by using tubes in the walls and floors. He will do away with smoke and coal bins, and the hauling of coal; and homes, cities and factories will be spic and span.

Perhaps we don't need any one guy to start all this—maybe we can do it ourselves.

SIMPLIFICATION ★ A VICTORY AID!

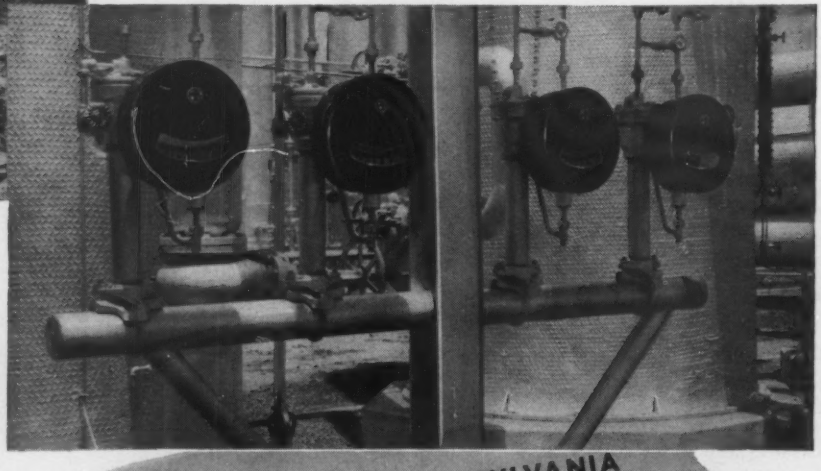
All 9 Lives!



Metric-American orifice meters installed near well head.

☆ ☆

Right . . . A group of Metric-American indicating flowmeters.



MAINTENANCE IS A SIMPLE MATTER—if and when it is necessary for a Metric-American meter. Continuous engineering development has reduced its construction to the fewest number of parts practicable.

For example, there is only one moving part between mercury surface and chart record. (Our sylphon-actuated orifice meter, with spring-loaded bellows replacing the usual mercury manometer, is applicable where mercury use is inadvisable.)

Ruggedness of construction throughout, eliminates any great problem of keeping Metric-American meters fit. Connections between chambers of the differential gage body are both screwed and welded. . . . No detail is overlooked.

What is most to the point . . . Metric-American meters and flowmeters not only bear up under toughest service conditions, but also *hold their accuracy* . . . without pampering. Given regular inspection, you can count upon any American instrument to last its full "nine lives". Actual performance records . . . thousands of field reports . . . all prove this.

METRIC METAL WORKS • ERIE, PENNSYLVANIA

AMERICAN METER COMPANY

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MEASUREMENT ENGINEERING AND PROCESS CONTROL

For the asking: bulletins that will acquaint you with all Metric-American instruments for flow measurement and control of gases, air, steam, oil and other fluids.

1932

THERMALLY THINKING

By ELLIOTT TAYLOR, Washington Editor

Briefly Noted

GAS company executives at the Natural Gas Management Conference in Cleveland were privileged to listen to the two top-flight war agency directors who share between them about all of the governmental authority over natural gas, J. A. Krug, director of OWU of the WPB and E. Holley Poe, director of the Natural Gas and Natural Gasoline Division of PAW. While it must honestly be admitted that neither was able to tell the audience much that wasn't already known, their presence together on the same program was both stimulating and encouraging to the industry. The general tenor of their remarks, and the readiness with which each agency gave full credit to the cooperation and assistance of the other went far to set at rest the fears that all of Washington is a scene of internal politics and surreptitious grabs for power.

Under a system of divided authority over a great industry that might easily be productive of problems of overlapping jurisdiction, there now prevails a harmony that might easily serve as a guide for other government administrators.

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With the coal wage dispute unsettled at the present writing, we are struck by the fact that about the only time the mine operators and the unions are in agreement is when they are rushing into hearings in opposition to any new proposed natural gas pipe line extensions.

• •

Cut it any way you like, but Harold Ickes was the man who grabbed the bear by the tail in the threatened coal strike. When and if the WLB gives the miners more money, on whatever face-saving formula may be advanced, the fact still remains that Horrible Harold sent John L. Lewis back to instruct his followers to return to work. We have witnessed over a period of years the gradual rise of Mr. Ickes to his present position, which is no less than highest in public confidence and esteem. In an administration where the personality vendors have wisecracked and charmed their way into and out of public respect, it is heartening to note that the honest, self-confessed curmudgeon can have his day.

• •

We believe that the most critical days of shortage in materials for maintenance and repair of public utility properties have now been passed. The ceiling demand for naval and military supplies of many kinds is approaching if it has not already been reached. Production capacity released by the changing of demands from the military machine to the expendable materials needed to keep it in operation will be earmarked principally for basic civilian requirements. Public utilities are considered at the head of the list in this category.

The official view is that the winter of 1943-44 may be the most critical one of the war as far as the gas supply is concerned. Last winter's principal shortage areas will have relief in the form of new pipelines and looping that should enable them to pull through provided rigid economy of gas consumption is exercised by all consumers. Many areas will have to operate dangerously close to peak capacity, however, and a succession of degree days might upset all calculations. WPB recognizes the effectiveness of the gas industry's campaign for domestic conservation of gas during the past winter and will officially urge the continuation of that campaign until the 1944 crisis is past. Gas rationing is not now viewed as anything but a most remote possibility.

• •

We are trying to forget where we heard this one, but: It seems that the electrical industry had to be forcibly reminded of the good neighbor policy among competing utilities recently when a power company in the near-deep south seized a war-time opportunity with understandable enthusiasm but questionable ethics to promote the sale of electric space heaters in a territory where restrictions had been placed on the sale of gas for heating purposes. The local gas company came out of its corner fighting and launched a vigorous complaint with the director of the Office of War Utilities. Upshot of the matter was a meeting of EEI bigwigs in Washington at which the electrical industry agreed to forego any further competitive advantages growing out of war restrictions.

■ ■

Cooperation Required

THE recent schism in the ranks of the AGAEM that led to the appointments of a new managing director and counsel has been productive of much discussion on the part of appliance and equipment manufacturers looking to closer cooperation with the gas companies through the medium of AGA. We believe that much benefit can be derived by both the manufacturers and the gas companies by such cooperation, provided always that it remains just that—free and whole-spirited cooperation with never an attempt at domination by one group or the other.

As closely as their business interests may often be allied, the fact remains that the problems of manufacturers are not the same as the problems of the gas utilities, and neither group is competent to take over and solve, much less attempt to dictate the policies of the other. The gas industry as represented by the utilities owes a considerable debt to the manufacturers of all gas utilization equipment. New and improved appliances, coupled with vigorous promotion and a keen market alertness have created an acceptance for gas as a fuel that was only a secondary enthusiasm carried along by the gas burning equipment that fired the imagination of consumers. The trend toward electric cooking that at one time threatened to become a mass migration has been arrested by the diligence and ingenuity of manufacturers who produced ranges with every desirable feature of the electric stove combined with the myriad advantages of gas.

In the past 20 years we have seen instances too numerous to mention in which the conservatism and reactionary tendencies of many old-line utilities have been completely overcome by the sheer enthusiasm of appliance manufacturers for both their product and the fuel that it burned. The manufacturers, on the other hand, have had the benefit of the experience, the advice on utility merchandising problems, and the prestige and community standing of the gas companies. This interchange of suggestions, of ideas, and the joint

attack on mutual problems have contributed in a major degree to the success of all factors interested in any phase of gas sales and utilization.

It is inevitable that there should arise from time to time honest differences of opinion in any organization. Neither the AGA nor the AGAEM has proven to be any exception to this general rule. Yet we are convinced that these differences, when they do arise, are best solved by the time-honored method of compromise and agreement from within, rather than the enlisting of some supposedly stronger support from outside the ranks of the organization. If political and military alliances can be taken as any criterion, they amply prove that to solicit and accept the support of a stronger power is to eventually become subservient to that power.

We believe that the uninterrupted progress of the entire gas industry can best be served by a forward-looking group of manufacturers on the one hand cooperating fully with a progressive gas association on the other, and with neither occupying, by implication or in fact, a position subservient to the other.

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Safeguarding the Future

CURRENT indications are that the national advertising campaign, appearing over the signature of the American Gas Association, will be able to continue for another year without the serious curtailment that a few months ago appeared imminent. We understand the feeling of those utilities that have considered the advisability of such curtailment in the light of the conditions that prevail and will continue to prevail until the war is ended. On the surface it may appear a futile and impractical endeavor to advertise a service that the purveyors themselves wish only could be subject to less pressing demand on the part of its consumers. Superficially it might well be made to appear that the time and energy and materials required to conceive and execute an advertising campaign — any advertising campaign—could better be utilized in an immediate and more apparent contribution to the prosecution of the war. It is noteworthy that these arguments find their loudest proponents among those who were never thoroughly convinced of the value of advertising, even in the most propitious times.

We are well aware that the advertising campaigns of today, both in magazines and radio, have about them a note of suspended commercial animation that is at times almost pitiful. Campaign directors and copy writers who long ago earned their laurels by the simple expedient of saying "Buy now" in the greatest number of ways, and in the most convincing form, are searching in bewilderment for new synonyms to promulgate unheard of advice—"Wait until after . . ."

The buying public that today must content itself with the meager and dwindling supplies that rationing can allow is being beguiled into fanciful dreams of the new products and new services that will be available after peace has been achieved.

One of the prime arguments for a continued advertising policy until that day is that the company or the industry that fails to keep alive the public acceptance that has been created may wake up to find that this priceless asset has been lost forever to the competition. We do not discount this possibility, since business history is full of examples of companies that fell on the fallacious assumption that a market once won became henceforth and forever the exclusive property of the first successful suitor.

And certainly as far as the fuels competing with gas are concerned, there is every reason to believe that their promotions after the war will be just as intelligent and just as ruthless as they have been in the past. Electricity with its tremendously expanded generating capacity has already preempted in its dreams the entire cooking and water heating load of the progressive segment of our population. Coal, with its thousands of new heating customers, added practically by government decree, has no intention of letting go the bonanza that wartime necessity has opened up to it. Oil, with new transmission facilities to carry it rapidly and economically to every part of the country, will speedily seek to make up for the lean years of curtailed domestic consumption.

Thus as a safeguard for post-war activities, both company and industry, wartime advertising must appear to even the most casual observer as a prudent course to follow. There is, however, an additional consideration less frequently discussed, but in our opinion of even greater significance, that should be taken into account. It is the effect that present advertising may have not only on the markets of the future, but on the rights of contemporary business to serve those markets under a system of free democratic enterprise. It has been aptly observed that war makes strange bedfellows, and certainly this is nowhere better exemplified than in the existing truce and alliance that has been formed by New Dealism and American business enterprise. But while the social and economic theories of our own world planners are quiescent in the interest of internal harmony, only the most naive would allow himself to believe that these theories have been abandoned, or that their proponents have given up in despair. Their blueprints of the new order that once adorned the walls of every new public building are back in the drafting room at present. But line by line and detail by detail they are being refined and the strategy for their adoption is being developed as assiduously now as it was in the days of the great boondoggle.

Today Americans are being given only sneak previews of the Utopia that is to be ushered in after the war, if the contemporary planners can sell their bill of goods to the post-war electorate. Just as New Dealism slipped in on the heels of the depression, the new order is to be unfolded as the only solution to the commercial and economic problems that the cessation of hostilities is bound to create.

Then, as before, the cry will be raised that business is incapable of charting its own course, that only regimentation and planning and authoritarian management from above can save America from revolution and chaos. The problem then for private enterprise will be not only to repudiate this doctrine in words, but to invalidate its tenets by decisive and well-planned action when the day of decision is at hand.

We have ample reason to believe that the gas industry, along with every other important segment of American business, is planning with intelligence and foresight to meet the problems of tomorrow. But the gas industry shares with all utilities the vulnerability to political attacks that have been so pronounced in the Roosevelt decade. Planners who are wed to socialist theories inevitably look on the private ownership of public utilities as the first and easiest hurdle to be cleared. Thus it behooves all utilities to see to it that their post-war plans are not only sound and capable of quick and easy transition from war-time operations, but also that they have built during the war a cumulative public opinion that will support their right to proceed with those plans under a minimum of political interference.

There is of course no adequate substitute for honest service well rendered in building and maintaining this public acceptance. But as an auxiliary aid the use of continuous, constructive and forward-looking advertising cannot be overestimated. We commend continuous and uninterrupted national advertising to the natural gas industry, not only as a protection of its future gas load, but as an element that will be a sizable factor in guaranteeing its free and unpersecuted survival.

WAR CONFERENCE REPORTS

Natural Gas Industry War Problems

By BURT R. BAY

Chairman, Natural Gas Section, American Gas Association

EXCERPTS FROM an address, "Problems of the Natural Gas Industry Under War Conditions," presented by Mr. Bay before the American Gas Association Natural Gas Management Conference held in Cincinnati, Ohio, on April 28, 1943. Mr. Bay is president of the Northern Natural Gas Co., Omaha, Neb.

LONG before the day of Dec. 7, 1941, when war was forced upon the American people, the natural gas industry was keenly aware of the many new burdens and responsibilities that even then seemed inevitable. It was also aware of the facts that with the advent of war, these would be added to the normal requirements of the peacetime pursuits of the industry and the need for our product would continue to grow with the passing of time in somewhat direct relationship with the increased tempo of war manufacturing.

The men of the industry accepted this challenge, and the results are clearly written in the record of the industry's performance to date which discloses that all previous totals of production and consumption have been exceeded by substantial margins. This has been accomplished partly by the preparations made in advance of the outbreak of war and more recently, with the advent of all of the restrictions upon the use of critical materials, by operating our plant at a higher rate of efficiency.

The sheer will to accomplish more to help the war effort cannot maintain this upward curve of performance indefinitely and sooner or later, unless the problems of the industry are recognized by the governmental agencies in control of the supply and distribution of materials, we shall cease to register gains and may slip backward. After all, the maintenance of our stock in trade, natural resource that it is, requires a never-ending expenditure of labor and materials in the drilling of wells and the lifting and laying of pipelines as old fields give out and new ones are developed. We cannot suspend this type of operation year after year and continue to contribute to the war effort on the present scale, neither can we make a greater contribution unless there is recognition of all of the needs such an obligation entails.

Possibly more expressive of these points are some of the data contained in recent reports pertaining to the natural gas industry. Net additions to "utility plant" of the entire industry for the year 1941, which includes investments in gas pipeline and distribution properties, involved the expenditure of about $120,000,000. While complete data for 1942 are not yet available, it seems certain that like expenditures will only be a fraction of the 1941 total.

Singling out the item of gas well completions, the record discloses that there were 2911 wells drilled in 1941 and the average of such completions for the five years ended with 1941 was 2501. For the year 1942, the number of gas wells drilled was only 2089, which was 822 less than the total for 1941.

The conclusions I draw from this brief and admittedly incomplete showing of the situation presently confronting the industry are that within reasonable limits the capacity of pipeline systems to transmit gas is frozen until greater amounts of steel are made available and with regard to supply, the margin of difference between the total deliverability of all producing gas wells and the capacity of existing transmission facilities is a gradually reducing quantity. In some producing areas, this latter condition is not yet a matter of moment but in others it is one that compels consideration now.

ON THIS and the following pages are published excerpts from papers presented before the American Gas Association's Natural Gas Management Conference and Twentieth Annual Distribution Conference held in Cincinnati during the week of April 26, 1943.

Appalachian Area: Any analysis of our gas supply problems by areas poses some odd and radically different situations. By way of illustration, there are some 54,000 producing gas wells in the entire country, exclusive of combination wells producing both oil and gas, and of this total number of gas wells, 42,000 are located in the five states of New York, Pennsylvania, Ohio, West Virginia and Kentucky, which comprise the Appalachian gas area.

The annual volume of natural gas currently produced and marketed in such area exceeds 400,000,000,000 cu. ft., which approximates 15% of the total of all marketed natural gas. To maintain this rate of production, during recent years, 53% to 70% of the total of all new gas wells completed have been drilled within these five states. The natural gas produced in the Appalachian area, aside from supplying the domestic and commercial needs of some 3,000,000 domestic and commercial consumers, has long been the prime fuel for countless specialized manufacturing processes throughout this highly industrialized area.

Therefore the continued maintenance of a supply equal to the total requirement imposed by all consumers becomes a matter that can neither be cast aside nor treated lightly. The answer to the immediate situation in this area probably lies in increased drilling—the long-range view points toward the need for the importation of gas from other producing areas.

Middle West Area: In those middle western and Rocky Mountain states which afford substantially all of the market outlet in the area lying north of New Mexico, Texas, Arkansas and Kentucky, the current annual rate of consumption of natural gas for all purposes closely approximates one-fourth of the total of all marketed natural gas in the country. Of this total of some

750,000,000,000 cu. ft., about 40% originates in the Hugoton and Texas Panhandle fields where generally speaking the reserves are ample and the maximum rate of withdrawal by pipelines is not excessive. There are, however, local situations and conditions applicable to each of these producing fields that merit and will require consideration with the passing of time.

The remaining 60% of the supply of these states has its origin in some 250 different gas fields or producing areas. A few of these sources of natural gas might be classified as flush, others have declined considerably and some will soon reach the point of abandonment. Quite a lot of concern already exists in the minds of the executives of those companies whose properties are dependent to any considerable extent upon the latter named sources of supply.

The remedy lies in making available to such companies enough steel to drill needed wells and to extend facilities to other sources of supply, as the total gas reserves of the area are entirely adequate if gas from the more prolific sources can be made available to sections and communities where there is evidence of an impending shortage.

Southern Area: Some of the most prolific of the known sources of natural gas are in the states of Texas and Louisiana and with large reserves available in these states and lesser reserves in adjoining states, market outlets of tremendous proportions have been developed throughout the south. Stated in another way, five southern states—New Mexico, Texas, Arkansas, Louisiana and Mississippi—produce approximately one-half of all of the natural gas marketed in this country and they consume within their own borders almost 80% of the gas they produce. Oddly enough, these states produce this volume of gas, except as it is supplemented with casinghead residue gas, from about 10% of the total number of all gas wells, which attests to the nature of the available supply.

Another major influence, favorably affecting both the present and future gas supply of the area, is the growth and development, during recent years of recycling and condensate recovery operations. With due regard to these favorable factors, the very magnitude of the natural gas operations carried on in these states, the constantly growing fuel needs of an expanding southern industry, and the diverse nature of the different sources of gas supply all contribute to the problems of the industry in this area and add to their complexity in war times.

Pacific Coast Area: On the west coast, substantially all of the natural gas is produced and consumed in the state of California—here the producing situation is somewhat unlike that existing in any other section of the country — the current annual rate of production and sales of natural gas in the state, as in the Appalachian area, approximates 400,000,000,000 cu. ft.—ordinarily less than 10% of this volume is produced as dry gas from gas wells and more than 90% of the total is produced in conjunction with oil—since the preponderance of California's natural gas supply is essentially a product of oil operations, the rate of gas production is affected by the rate of oil production.

The two operations being so closely related present the country's most novel natural gas production complexity. Drilling problems are largely oil development problems, as the dry gas portion of the total supply is produced from a comparatively small number of gas wells. The whole matter of gas supply is one that taxes the ingenuity of the two industries at times and compels close coordination of effort—especially under war conditions.

Viewed in a broad sense, the natural gas industry development problem except as it is influenced by variations in the supply of casinghead residue gas, appears to sum up about as follows: An analysis of government statistics shows that for the five-year period, 1937 to 1941, inclusive, 992 new dry gas wells were completed for each trillion cu. ft. of natural gas utilized and marketed. A recent report of the Texas-Mid-Continent Oil and Gas Association contains an estimate which places the total of all marketed natural gas for the year 1942 at approximately three trillion four hundred billion cu. ft. Accepting this estimate and using the five-year average drilling experience per unit of volume marketed, the industry might reasonably have completed 3373 new gas wells during 1942 to offset the decline in the available supply, instead of the total of 2089 actually drilled, which was about 40% less than the indicated need.

The second phase of the gas supply problem, like the ever-present requirement to drill new gas wells in productive areas, is that which arises through necessity to augment the gas supplies of partially depleted fields where development is no longer practicable. This may resolve itself into need for installing compressors, looping existing pipelines or laying entirely new main gathering lines. The amount of steel required in individual cases is measured somewhat by the volume of new gas required to be replaced on the maximum system day and the location of the new supplies with respect to transmission mains—a part of this construction requirement can be met from time to time by lifting and relaying lines and moving idle compressor equipment, but in many instances the only practical solution lies in the use of new materials.

There is growing evidence of this type of need in some localities—it is not something to postpone until the day of actual necessity—it is not a post-war problem—it is a must that calls for planning and execution in advance of the day of actual shortage of gas.

I do not believe it is an overstatement to say that these production needs of the industry are of sufficient importance to justify their full recognition. They are inherent with our type business and to meet the need would only be giving fair consideration to the values and economies which can be derived from the maximum use of natural gas in the war program. It is the industry's responsibility to show the way and press for those considerations to which it is justly entitled. It is the responsibility of the War Production Board and Petroleum Administration for War to see that the natural gas industry receives a fair proportion of such total supply of critical materials as can be made available for use by essential industry.

Try as I may to look upon the dark side of things, I always find some favorable factors in our business outlook. Right now we are enjoying a larger volume of sales than ever before in our history and while taxes and other forms of expense cut heavily into income, it is my conviction that the industry remains in a strong position. True, many companies have been hurt earnings-wise, yet in contrast a few have registered gains. On the whole, an analysis would show that the affairs of the natural gas industry are in a sound state—it has suffered fewer dislocations than many other types of business. Its record is clean—there has been no hint of scandal in the conduct of its affairs—its business is intact. Furthermore, the industry's service has been of such nature as to warrant the belief that we have strengthened the ties between company and customer, and in contrast with the general upward trend in the cost of practically all commodities, the cost to the consumer of natural gas, with few exceptions, has not risen and in several areas substantial price reductions have been made. This war period record is impressive and one that we may be proud of. To me, it exemplifies the spirit of this industry.

Teaching the Customer to Help Himself

By DONALD S. BITTINGER

Superintendent of Service Department, Washington (D. C.) Gas Light Company

EXCERPTS from a paper presented before the American Gas Association, Technical Section, Twentieth Annual Distribution Conference, Cincinnnati, Ohio, April 29-30, 1943.

SUCCESSFUL teaching involves the creation of interest for the student and a clear, effective presentation by the instructor. The government's job training program uses as a motto, "If the worker hasn't learned, the instructor hasn't taught." Our chief concern in educating customers to do things for themselves should be: How to create that interest! and: How to present a concise educational program in an economical manner to the extent that it continues to benefit the utility and retain the interest of the customer!

However, if we can determine how and to what extent such a program should be carried on, if we can be sure we are retaining the interest of the customer, now is the opportune time to foster such a project as an aid to the war effort. We have found in Washington that customers seem particularly interested and willing to cooperate because they want to do their share by helping us to save gasoline, rubber, time and material.

The Washington Gas Light Co.'s instruction activities began for house heating as early as 1933, but did not take intensive form until July of 1940, when the number of house heating customers on the lines of the Washington and nearby Maryland companies had grown to 29,000, an over-all average increase of 28% per year since 1930, the year which marked our first real promotional effort. Our company had undergone a sad experience in the fall of 1939 when a cold wave coincided with the usual "moving day" around Oct. 1. All incoming telephone lines were literally "jammed" most of the day and night and the company found it impossible to give service to some customers until several days after the original call. It became apparent that an intensive campaign was necessary.

In order to begin that intensive campaign, all house heating customers were recorded on Hollerith (or I. B. M.) punch cards and sorted by make and model. This information was later transferred to an addressograph file and kept in route and account number order. After a training course, a crew of 14 men with sales experience, supervised by one of the sales department representatives, was taken to a particular area of the city and dispatched with orders and instruction booklets.

These men executed their orders by a house-to-house canvass of the locations called for on their orders. Explanation and demonstration was given to the customer and the instruction booklet wired to the gas supply line or somewhere near the furnace. If the owner or person who took care of the furnace was not at home, the booklet was always left wired near the heating equipment. In many instances a second call was made by appointment to instruct the man of the house. The address is always plainly marked on the face of the instruction booklet so that in the event of new occupancy, the new owner or tenant will realize the booklet applies to that particular heating equipment.

This instruction crew was carefully trained in the operation of a particular make and model of house heating equipment. The crew executed the orders of the most prevalent make and model as a separate group. Progressively, a different type house heating appliance was added to the instruction crew's work until ultimately orders for many different makes and models could be routed and dispatched together as the personnel of the instruction crew gained experience. Some 13,500 orders were completed in a little over three months' time at a cost of approximately 65¢ each, including all training, time, material and transportation.

Eight different instruction booklets have been designed, each including instructions for manual operation in the event of power failure. Some are designed so that the single booklet may be marked for use on any one of several makes and models. The elimination of only one turn-on or turn-off request more than justifies the expense of teaching one particular customer.

This intensive house heating instruction program has been followed up by calling the customer's attention to the advisability of knowing how to care for his house heating equipment. A letter to customers Aug. 28, 1941, related newspaper advertisement of Sept., 1941, a notice inserted in bills of April, 1942 (Fig. 1), and a letter Aug. 24, 1942 (Fig. 2) were successive steps following up the original instruction program. Also servicemen carry a copy of each of the different instruction booklets and are supposed to give a customer instructions on any service call or on voluntary inspections. Manual operation is always included in instructions. Now, on the periodic inspection of all house heating equipment, the men in the field find an instruction booklet on the vast majority of premises.

Since Pearl Harbor, of course, we have become more conscious of the need for teaching customers to do things for themselves on appliances other than house heating. The national emergency made it necessary for us to alter company policies so that requests for service are executed on the same day only if the call is of an emergency nature, such as a leak, no hot water where there is a baby or illness in the family or no heat in severe cold weather, etc.

The telephone service bureau, which receives all customer service calls, has done a good job in educating customers entirely by telephone to expect this less prompt service. No radio or newspaper announcements have been made. The public received the curtailed or delayed service in a cooperative manner and became more conscious of the advantages of knowing their appliances and how to operate them. The telephone service bureau also assists the customer in handling minor services which the average consumer should know how to do. For instance, frequently the customer who has been previously instructed in the operation of house heating equipment may call to ask questions concerning the lighting procedure. The telephone service bureau man will go through the instruction booklet step by step with the customer.

Assistance is given by phone in turning off all appliances, and in summer operation, oiling motors and cleaning filters for warm air equipment. The

telephone service bureau may give suggestions for cleaning ranges inside and out, lighting or turning off refrigerators, when to defrost, how to keep trays from sticking, etc.

No instructions are given by phone for a major servicing operation. This spring the telephone service bureau expects to handle the majority of those requesting the turn off of house heating by instructing the customer by phone how to turn off his own equipment. For the first three months of this year compared to last, the number of requests for service have decreased 29% and the number of completed orders have fallen off 40%.

In newspaper advertisements and bill inserts, the general theme has been one of gas conservation. However, mention is usually made of the necessity for keeping all gas equipment in good operating condition. A small folder for commercial customers entitled "Keep 'Em Cooking" stresses the importance of knowing something about equipment and keeping it in good condition. These were distributed to commercial customers at a combined meeting of the Bakers and Restaurant Association.

Voluntary commercial service inspections have been somewhat curtailed, but not discontinued, as the demand on commercial cooking appliances in Washington is very heavy. A "Maintenance Chart for Gas Cooking Equipment" was mailed out to commercial cooking customers. This chart gives the manager or chef very good instructions on the proper care of commercial appliances.

The company also sponsored a regular commercial radio program and in many of the "commercials" or "plugs" introducing and closing these radio programs, reference would be made to the "Home Volunteer's Defense Manual," and the listener was invited to pick up one of these booklets free of charge at the company offices. This little booklet was published by Servel, Inc. In addition to covering nutrition suggestions and the use and care of the gas refrigerator, it gives in a clear, concise manner useful household hints for taking care of the range and water heater.

While the listener's interest in this Home Volunteer's Defense Manual may be aroused by nutrition, the utility accomplishes something on "Teaching Customers to Do Things for Themselves as an Aid to the War Effort" through the section on "How to Make Your Household Equipment Last Longer." Also, on Jan. 6, 1943, a woman who conducts a home forum interviewed the superintendent of the service department on the care of the household gas equipment. The company is at the present time sponsoring a broadcast pertaining to victory gardens, three times a week, and is participating locally in the national hookup program, "Fashions in Rations." Care and operation of equipment has been and will be stressed from time to time in the introductory and closing announcements.

Another form of attempting to reach the general public on the importance of taking care of equipment himself has been through the medium of talks before organizations of one kind or another. Whenever opportunity presents itself, the company has its representatives talk before various groups of the OCD organization, home maintenance and repair groups of the American Women's Volunteer Service, and the Washington Restaurant Association.

The Home Service Committee of the AGA has published a pamphlet, "Uncle Sam Wants It to Last." This pamphlet, forwarded by our home service department to the food and home economics departments of radio stations and newspapers, has been used from time to time as a source for household hints to be included in programs and newspaper articles. Some of the range manufacturers have published instructions

NOTICE TO GAS HOUSE HEATING CUSTOMERS

During the recent damaging snowstorm some sections of the city were temporarily without electric power. In these areas certain controls on gas heating equipment were rendered inoperative.

Under these conditions we feel it essential that users of gas heating equipment should know how to operate such equipment on manual control, i.e., without electric current. The fact that military requirements have depleted our experienced Service personnel suggests that in the event of a sudden cold snap we may not be able to take care of your turn-on request without considerable delay. Furthermore, the strong possibility of wartime bombing or sabotage makes it still more important that you know how to turn on, turn off, and manually operate your equipment during a power failure.

If you are not completely familiar with the above operations in regard to your heating equipment, call your Gas Company—REpublic 4500—and we will make arrangements to instruct you.

IMPORTANT! To Users of Warm Air Heating Plants

OILING OF FAN AND MOTOR BEARINGS—The suggested practice is for the user to oil the fan and motor bearings regularly every two months.

FILTERS—Remove filters when heating equipment is on manual control.

INSPECTION AND CLEANING OF AIR FILTERS—Filters have been placed in your air conditioner to remove particles of dust and dirt. When they become clogged they retard the distribution of air and the operating efficiency of the system. The general practice is for the user to inspect and clean these filters twice during the heating season. Below is a list of firms which are equipped to supply filters and render filter and motor service:

AIR FILTER SERVICE
SHephard 2233
903 Flower Avenue, Takoma Park, Washington, D. C.

ATCHISON & KELLER, Inc.
ADams 1666
Rear 1416 Irving Street, N.W.

HUDSON AIR CONDITIONING CORP
District 1070
Office: 1727 Pennsylvania Avenue, N.W.
Service Department: Seventh and T Streets, N.E.

A. S. JOHNSON COMPANY
METropolitan 4338
1240 Ninth Street, N.W.

McCREA EQUIPMENT COMPANY
REpublic 3424
316 Second Street, N.W.

SEARS, ROEBUCK & COMPANY
911 Bladensburg Road, N.E.—FRanklin 7500
Albemarle Street and Wisconsin Avenue, N.W.
ORdway 1122
2800 Wilson Blvd, Arlington, Va.—CHestnut 7722

TAKOMA ENGINEERING COMPANY
SHephard 5400
923 Selim Road, Silver Spring, Md.

UNITED CLAY PRODUCTS COMPANY
District 0787
4711 Bethesda Avenue, Bethesda, Md.
Wisconsin 5141 and 1408
Fourth and Channing Streets, N.E.
HObart 3334

FIG. 1. Newspaper advertisement directed to house heating customers.

WASHINGTON GAS LIGHT COMPANY

ELEVENTH AND H STREETS NORTHWEST

WASHINGTON, D. C.

August 24, 1942

IMPORTANT NOTICE REGARDING GAS HEATING

Even under normal conditions, if a large proportion of our customers called at the same time in the event of a sudden cold snap, we could not handle the flood of service requests for several days. Also, your gas heating equipment would have to be operated manually in the event of severe storms, bombings, or sabotage, causing power failures. IN THESE TIMES, IT IS IMPERATIVE THAT OUR HOUSE HEATING CUSTOMERS KNOW HOW TO OPERATE THEIR OWN EQUIPMENT. The operations are simple and the majority of our customers do know how.

In order to care for those customers who do not now know how to operate their heating plants and to prevent a possible delay of several days in a cold house this fall, we must prepare a schedule which will enable us to complete instructions before the end of September. In order to plan this work, it is impossible to make specific appointments.

If it is not practical for someone in your household to operate your gas heating plant, we must arrange to light the pilot during September to prevent possible inconvenience to you.

FOR THE PROTECTION OF YOU AND YOUR FAMILY THIS WINTER, PLEASE SIGN AND FILL IN YOUR ADDRESS ON THE ENCLOSED SELF-ADDRESSED, STAMPED CARD OR CALL REPUBLIC 4500 TODAY, INDICATING WHICH SERVICE YOU DESIRE. IT WILL BE ASSUMED THAT CUSTOMERS NOT REPLYING ARE ABLE TO OPERATE THEIR GAS EQUIPMENT.

If there are further questions regarding this notice, call Republic 4500.

WASHINGTON GAS LIGHT COMPANY

FIG. 2. Letter to house heating customers following up on instruction program.

for adjustment and care of the range, which can be used to advantage for that appliance.

For some time our company had been calling the attention of customers to certain things which should have been done to improve the utilization of gas, only to find later as a result of another service call that nothing had been done in response to recommendations. The person advised frequently forgot to pass the word along to the owner, or the message was inadvertently altered. We designed a form which has proved very valuable in calling the customers' attention to conditions to be corrected—a pink notice (Fig. 3).

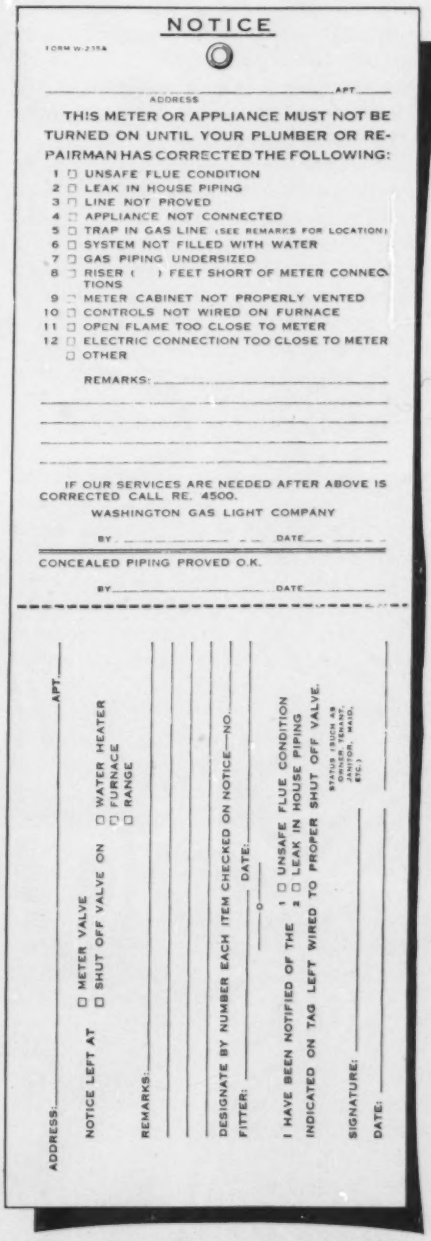
This form is filled out by the serviceman and left at the appliance or at the meter as a notice to the customer that some condition should be corrected. The tag has a stub which is filled in and signed by the customer for deficiencies which we believe may result in an unsafe condition. When the customer signs one of these stubs as an indication that he has been duly notified, the stub is returned to the office and a letter is sent by the commercial manager to the person in whose name the gas account is carried, as further assurance that the customer is notified of work which should be performed. Generally the customer reaction to this notice has been good and we have received many letters of thanks from the householders.

Coordination With Air Defense

Some of you will naturally wonder how these different methods of "Teaching Customers to Do Things for Themselves as an Aid to the War Effort" tie in with the Washington air raid defense activities. This company has not gone into wholesale instructions for the purpose of having customers take entire care of themselves in the event of an air raid. We have, however, conducted an employee training program wherein members of the non-operating departments of the company and the clerical force have been instructed in turning off and turning on gas. Some 200 employees are trained.

OCD instructions have informed the public that no attempt should be made to shut off the main gas supply unless the house is badly damaged, and that if the "main gas valve is turned off for any reason, do not turn it on again yourself. Call for a trained man." However the recent "Notes on City Gas for Air Raid Wardens," published by the United States Office of Civilian Defense, in addition to instructions to air raid wardens includes a section on "Typical instructions furnished to gas company customers who are competent to turn on their own gas." This section covers the sequence of steps to be taken in restoring gas service to premises but winds up by stating that if the customer is not "entirely certain and familiar with the method of lighting and operating your gas appliance, call on the services of a plumber, gas company employee or some other qualified person to turn on the gas."

As mentioned before, we have not attempted to instruct the public on how to shut off or restore service following an interruption due to air raid damage but it is believed that our efforts to assist the customer in becoming familiar with his equipment and thereby enable him to do things for himself under normal conditions as an aid to the war effort, would be equally useful in the event of an emergency such as the loss of pressure in a damaged section with its consequent shut off and restoration.



NOTICE

FORM W-2158A

_____ APT. _____
ADDRESS

THIS METER OR APPLIANCE MUST NOT BE TURNED ON UNTIL YOUR PLUMBER OR REPAIRMAN HAS CORRECTED THE FOLLOWING:

1 ☐ UNSAFE FLUE CONDITION
2 ☐ LEAK IN HOUSE PIPING
3 ☐ LINE NOT PROVED
4 ☐ APPLIANCE NOT CONNECTED
5 ☐ TRAP IN GAS LINE (SEE REMARKS FOR LOCATION)
6 ☐ SYSTEM NOT FILLED WITH WATER
7 ☐ GAS PIPING UNDERSIZED
8 ☐ RISER ( ) FEET SHORT OF METER CONNECTIONS
9 ☐ METER CABINET NOT PROPERLY VENTED
10 ☐ CONTROLS NOT WIRED ON FURNACE
11 ☐ OPEN FLAME TOO CLOSE TO METER
12 ☐ ELECTRIC CONNECTION TOO CLOSE TO METER
☐ OTHER

REMARKS: _____

IF OUR SERVICES ARE NEEDED AFTER ABOVE IS CORRECTED CALL RE. 4500.

WASHINGTON GAS LIGHT COMPANY

BY _____ DATE _____

CONCEALED PIPING PROVED O.K.

BY _____ DATE _____

ADDRESS _____ APT. _____

NOTICE LEFT AT ☐ METER VALVE ☐ SHUT OFF VALVE ON ☐ WATER HEATER ☐ FURNACE ☐ RANGE

REMARKS: _____

DESIGNATE BY NUMBER EACH ITEM CHECKED ON NOTICE—NO. _____

FITTER: _____ DATE: _____

I HAVE BEEN NOTIFIED OF THE 1 ☐ UNSAFE FLUE CONDITION 2 ☐ LEAK IN HOUSE PIPING INDICATED ON TAG LEFT WIRED TO PROPER SHUT OFF VALVE.

(STATE IF SIGNED AS OWNER, TENANT, JANITOR, MAID, ETC.)

SIGNATURE: _____

DATE: _____

FIG. 3. Form calling customer's attention to conditions needing correction.

No newspaper notices have been inserted asking the customer to refrain from calling the gas company for service. We felt this would be used only as a last resort in the event our telephone bureau was unable, through personal contact, to reduce selectively the number of calls. They have succeeded so well, we still see no reason for paper publicity. We did broadcast on the coldest day last winter, asking the customers to conserve gas, set the thermostat back to 60°, and use only one top burner on the range. We have also mailed out requests for thermostat settings carried by customers at different times of day. The replies were used to assist us in our annual distribution load study. Customer response to both has been exceptionally good. As a matter of fact, after the broadcast on the cold day, some customers called to ask if we wouldn't like them to postpone washday or if it was all right then to set the thermostat up to 65°.

Teaching Approaches

The number of different teaching "approaches" attempted by the Washington Gas Light Co. may be surprising, but we have been operating on the theory that the creating of interest is the most important task; that repetition through different mediums over a long period of time will bring home to the customer the advisability of "knowing how" and that through instruction booklets and teaching on service calls we will accomplish customer education.

Despite the fact that the metropolitan area of Washington is a boom town with an estimated population increase of over 300,000 since the 1940 census, total completed orders for the first three months of this year compared with the same period a year ago have decreased 40%, of which services on customers' premises fell off 37%. We give a great deal of credit for this decrease to the general psychological reaction of cooperating with the war effort, yet we can't help but feel that we have contributed to that reaction by repeated and different approaches to customer education.

With the serious loss in manpower already experienced, plus the further loss contemplated in the future, it seems imperative that we continue to use instruction booklets, bill inserts, newspaper advertising, the radio, demonstrations on the premises, and any other means of "Teaching Customers to Do Things for Themselves as an Aid to the War Effort."

The Future of Natural Gas Derivatives

By K. S. ADAMS

President, Phillips Petroleum Co., Bartlesville, Okla.

EXCERPTS FROM a paper, "The Future of Natural Gas and Its Derivatives," presented before the AGA Natural Gas Management Conference held in Cincinnati, April 28, 1943.

THE future of natural gas and its numerous derivatives has become a live subject in a world filled with uncertainties, in a world where new discoveries are changing the established order of things almost overnight. Although natural gas has, in the past, been regarded almost exclusively as a super-excellent fuel for use in special heating processes, it now appears that there are a number of other important uses, as in the manufacture of chemical derivatives. Consequently, it is only normal that we should speculate on the future of natural gas, on whether there are enough reserves to furnish future markets, and on whether those future markets will be as we have known them in the past or markets of a different character.

We will review briefly a few of the more outstanding developments in the field on converting natural gas hydrocarbons, or more properly, light petroleum hydrocarbons, into new products. In each instance, of course, it should be kept in mind that there are other routes to the ultimate products and these routes may involve the use of raw materials other than natural gas hydrocarbons. The chemist has turned to natural gas hydrocarbons only because they are ample and readily available. The same ultimate result might have been and might yet be attained by starting with coal, our other abundant supply of organic raw material.

New Developments in Two Classes

New developments may be considered, as falling into two major classes: (1) those concerned with the conversion of hydrocarbons into liquid fuels of superior characteristics to natural or cracked liquid fuels and (2) those concerned with conversion to other products. The volume of raw materials involved in commercial operations under the first of these classes is many times that involved in commercial operations under the second. That is why we discuss them in that order.

The hydrocarbons ethane, propane and butanes, which are currently being used as raw materials in processes for the production of liquid fuels, occur in appreciable percentages in natural gases before processing for transmission and are also present in residual gases from refineries as by-products of oil cracking. In the latter case, the subject hydrocarbons are, of course, associated with the corresponding olefin (unsaturated) hydrocarbons which have long been known as particularly desirable materials for chemical synthesis of various sorts.

The processes by which natural gases and the still more complex off-gases of refineries are converted to liquid fuels are extremely complex since all of them involve one or more of the chemical reactions known as pyrolysis (decomposition by the action of heat), dehydrogenation (splitting off hydrogen), polymerization (recombination of hydrocarbons deficient in hydrogen), hydrogenation (addition of hydrogen), alkylation (combination of unsaturated hydrocarbons with saturated hydrocarbons), and in some cases, isomerization (internal rearrangement of molecular structures).

The earliest of these developments, low pressure pyrolysis (thermal cracking) taught us that benzene, toluene, xylenes, and heavier aromatic products, formerly derived only from coal carbonization, could be produced from natural gas. This extremely versatile process not only can be made to produce the aromatics, but also the valuable olefin (unsaturated) hydrocarbons, which have so many uses in organic chemical synthesis. One of the olefins (ethylene) produced in this process is used in producing tetraethyl-lead, neohexane, much of the industrial alcohol, and ethyl benzene, which is ultimately converted to the rubber and resin raw material known as styrene. The higher olefins, similarly produced, are raw materials for aviation gasoline and butadiene, the other important rubber material.

Next, high pressure pyrolysis of natural gases gave the industry its first practical process for producing premium motor fuels from gases which were largely wasted prior to such development. It has been estimated that prior to the war, 30% of the available butane was being used annually in this process as a raw material to produce approximately 15,000,000 bbl. of high quality motor fuel.

Dehydrogenation, polymerization and hydrogenation brought forth the production of isooctane and other high octane motor fuels.

An astounding discovery along this line was announced a number of years ago, namely, that the proverbially inert hydrocarbons could be made to react with olefins to produce a saturated product. Fuels having octane numbers greatly in excess of 100, which will permit engines probably not dreamed of even five years ago, are now more than within the realm of probability through this newly discovered reaction. It is to this chemical reaction of paraffin alylation, a tool which has many unexplored applications in the field of chemistry, that the United Nations owe their present superiority over the Axis nations in aviation fuels.

New Commercial Process

One of the most recent commercial processes—isomerization of normal butane to convert it to isobutane—has made available for isooctane akylation a new supply of needed raw materials.

The volumes of selected fuels and selected fuel ingredients currently being produced is, of course, a military secret. We know that the volumes are large and that new facilities are constantly being created to make still larger volumes. No one can risk a guess as to what these fuels will make possible in the way of new pleasure cars and commercial aircraft for the simple reason that the same technological revolution is going on in other industries. Along with new light metal alloys and new plastic materials of construction, the effect of fuel quality will be only one of the items which will cause us to scrap our pre-war models of cars and aircraft.

Chemical developments in the natural gas industry other than fuels are numerous. Many of the products are used to a large extent as starting materials for the preparation of still other chemical products. Synthetic rubber and rubber ingredients are probably

the ones which are of most universal interest at this time. Synthetic rubber also constitutes one of the larger potential outlets for gas raw materials. The rapid growth of the synthetic rubber activity is, of course, traceable to the needs of war. Basically, the synthetic rubber industry is being built around the Buna-type rubbers, using a synthetic latex prepared from styrene and butadiene. A number of other types of synthetic rubber, namely, Neoprene, Thiokol and Butyl rubber, are likewise being manufactured but in lesser quantity.

Natural gas is also an important raw material in processes for the manufacture of high explosives. It is being cracked to produce hydrogen which is reacted with atmospheric nitrogen to produce ammonia. The ammonia is readily oxidized to nitric acid, which combines with toluene to form TNT. The reaction of ammonia with nitric acid yields ammonium nitrate, a base for explosives which is also a valuable fertilizer in peace-time.

Glycerine for the production of trinitroglyerine is another explosive raw material being made from natural gas.

Use for Plastics

Natural gas hydrocarbons after conversion to the corresponding olefins can be used as the basic materials for a wide range of plastics. Innumerable plastics are required for the manufacture of war implements. Likewise, they are being used in non-defense applications as substitutes for strategic metals, rubber and silk vitally needed in armaments. Most conspicuous of their war applications is in the housing enclosing the combat stations of bombardier compartments in aircraft. Plastic washing machine agitators, refrigerator door panels, sealing frames and freezing compartment doors are some of the many domestic uses of plastics.

A great amount of research is going forward in the field of natural gas as a chemical raw material. Undoubtedly, we can look forward to many more discoveries which will be of help in the present emergency and which will also fit into the scheme of things in the post-war world.

Capacities of large power and fuel companies which have been increased during this emergency will make available a surplus of electric energy and a surplus of other energy which may be used for cooking, water heating, space heating, house heating, and industrial purposes. The competing fuel, which has most nearly solved the industrialist's operating problem during this war emergency is most apt to get the greater share of stored-up good will in the return to peace-time economy. In this regard, we believe the natural gas industry has made rapid strides, but we must continue our efforts.

In conclusion, we believe that natural gas and its derivatives have a great and bountiful future. The reserves are plentiful for years to come. The many new developments of derivatives are permitting the natural gas producers to obtain a market for the heavier fractions without appreciable effect on the amount of gas available for sale as a fuel. There are many new and improved uses of natural gas as a fuel already in the making; undoubtedly more will be developed. The natural gas industry should move forward with confidence.

Playa Del Rey Field Storage Starts June 1

GAS underground storage operations at the Southern California Gas Co.'s Playa del Rey project will commence on June 1, according to H. P. George, manager of production and transmission. Mr. George's announcement follows the installation of eight 200-hp. compressors and a cooling tower.

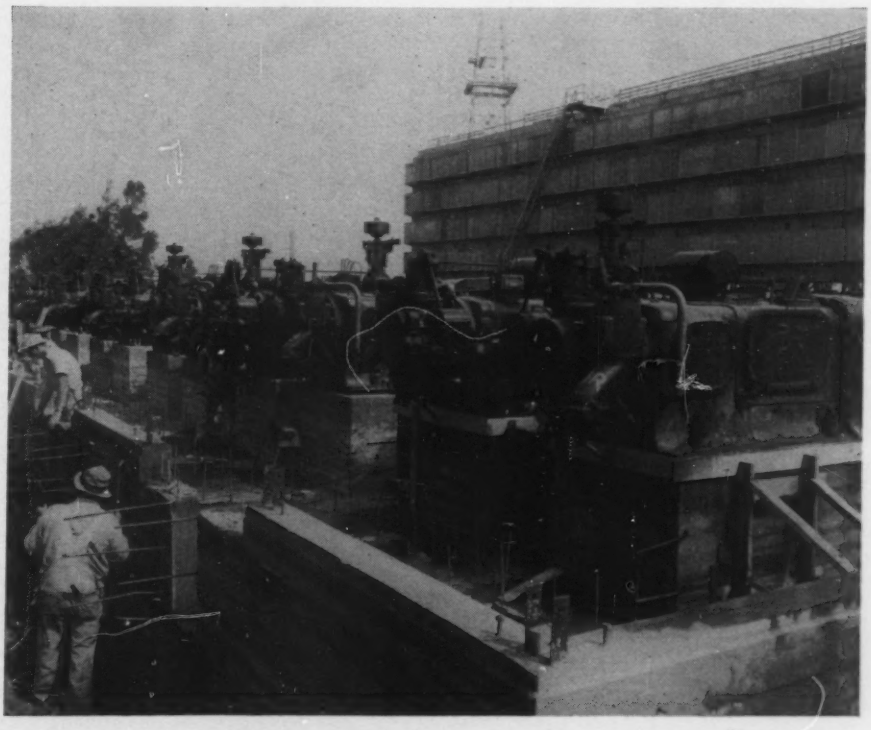
Before the actual storage can take place the following jobs will have been completed: Installation of auxiliary piping at the plant, connection of the plant with the source of supply and with five wells selected for injection, and the construction of the corrugated iron building over the compressor units. The Fluor Corp., Ltd., is in charge of the construction and installation work.

The eight compressor units, together with the cooling tower and the corrugated iron building used at the project were dismantled and moved by truck to the site from the inactive Pacific Lighting plant at Mountain View. The task of moving the eight 35-ton machines took eight days.

The units are two-stage compressors, the first stage compressing the gas from 150 to 350 lb. and the second stage compressing it up to 1200 lb.

Initial plans for the construction of this underground storage plant were announced in August, 1942. The pipeline to the site was laid by Southern California Gas Co. in October, 1942, and injection under 150-lb. line pressure commenced, pending completion of the compressor plant. After an official sanction by the War Production Board, work on the compressor station was begun on March 1.

When the plant goes into operation, it is estimated that injection will proceed at a maximum rate of 20,000,000 cu. ft. per day. It is expected that some 3,000,000,000 cu. ft. of gas will be available for use from the source during peak periods.



With the cooling tower up and compressors in place, the Southern California Gas Co.'s Playa del Rey compressor station (above) is nearing completion.

EFFECT OF CAMOUFLAGE PAINTING

On the Temperature of Plant Equipment

By OLIVER W. JOHNSON

Standard Oil Company,
San Francisco*

IN the past, light-colored paints have been almost universally employed for gasoline plant and oil refinery equipment. This choice has been based in part on appearance, and in part on the general belief that light-colored paints decrease the amount of heat absorbed from the rays of the sun, and so reduce the temperature of the equipment.

Camouflage paints are usually dark in color, and to change these dark colors might increase the heat absorption. On the other hand, there is a new kind of paint about which it has been said, "At the present there are obtainable all colors and shades of paint which still retain the ability of aluminum paint to deflect the sun's rays but which render the plant very inconspicuous."

In outlining the present discussion, considerable difficulty was experienced in developing a logical and simple method of approach. Any treatment of camouflage is incomplete without mention of the use of infra-red reflective paints. Understanding of the properties of infra-red reflective paints requires a review of the nature of sunlight, the laws of reflection and the significance of color. Heat absorption is related to color. The choice of colors and types of paints depends on an understanding of the basic principles of camouflage. These related subjects seem to pursue one another around in a circle and to offer no vulnerable point of attack.

Method of Approach

The most sound method of approach is to consider the basic facts first, among them a review of sunlight and what becomes of the energy which it brings to the earth's surface.

Such complications as absorption bands in the solar spectrum can be ignored and sunlight considered to be simply a mixture of a large number of lights of different wave lengths and colors, in the proportions which give to the eye the sensation of white light. By means of a prism, sunlight can be broken up and the rainbow colors red to violet separated one from the other. There are other components in normal sunlight which the eye cannot see. Very short waves, shorter than violet, and hence called the ultra violet, are invisible. They are very active chemically, and are responsible for the growth of plants and largely for the effect of sunlight on the human skin, known as sunburn. Invisible ultra violet rays are sometimes used to excite fluorescence in certain minerals which have the peculiar property of receiving the invisible "black light" rays and converting them into visible light.

At the other end of the spectrum are other waves, longer than the red and hence called the infra-red, which are also invisible. The infra-red rays are capable of affecting certain specially treated photographic plates. They are sometimes called heat rays because they are akin to the radiant energy given off by a heated body such as a steam pipe. These so-called heat rays are not necessarily better carriers of heat than other rays. The name is derived from the fact that they have no other conspicuous properties.

A substance which does not transmit light is said to be opaque, and such materials are used as the pigment or light stopping medium in paints. When the sun's rays strike a painted surface, part will be reflected and part absorbed. The absorbed part is always converted into heat.

The pigment employed in a paint gives to the painted surface the light-reflecting and absorbing characteristics of the minerals of which the pigment is made up. When several minerals are present, the property of the pigment is a composite of the properties of the components. This subject becomes quite complex when dealing with colored pigments, and could be avoided entirely were it not for this question of infra-red reflectivity which is to be clarified.

A white substance is by definition one which reflects equally all the light rays which reach it. The commonly used white pigments, consisting of the oxides of lead, zinc and titanium, are truly white, in that they reflect not only the visible rays but also the invisible infra-red rays. In other words, these pigments are infra-red reflective, although this expression is not generally employed when referring to white pigments. The important point is that a white surface reflects all of the rays which strike it in equal proportion, so that the quality of the light reflected remains unchanged. A white surface will usually reflect up to 70% of the radiation received. Consideration of polished metal surfaces, which have special properties, will be avoided.

A truly black substance absorbs practically all of the radiant energy which it receives. The absorbed energy is converted into heat. Lampblack and most other common dark pigments are truly black, absorbing both the visible and invisible rays.

Since neither the common white nor the common black pigments show any selective absorption in the infra-red region, it follows that the common gray paints, made by mixing white and black pigments, will reflect the infra-red in about the same proportion as they do the visible rays.

Color Problems

Colored pigments convey to the eye a sensation of color, because instead of reflecting all wave lengths equally they reflect some one wave length more than the others. The light not reflected is, of course, absorbed, hence it follows that any colored pigments when exposed to the sun's rays must absorb more energy than a white pigment and, consequently, *must be warmer.*

In the same way that some colored pigments reflect some of the visible rays more strongly than others, it has been found that certain colored pigments also reflect the invisible infra-red rays more strongly than others. For example, while some green and brown pigments absorb almost all of the infra-red light which strikes them, others of similar visible color are quite reflective to the infra-red. As ordinarily employed, the expression, "infra-red reflectivity," means that the pigment reflects a higher percentage of the infra-red than it does of the visible light. This property is not visible, and must be revealed photographically or by photometric measurement. The significance and importance of infra-red reflectivity as applied to camouflage are best illustrated by an example.

Review the part which paint plays in camouflage. When we look at an aerial

*Delivered before a monthly meeting of the California Natural Gasoline Association, Los Angeles.

photograph or map, certain things stand out much more conspicuously than others. Some of these things, such as rivers, lakes, woods, bays, etc., are natural objects. Others, such as buildings, roads, plowed fields, etc., are man-made, and are conspicuous because of color, shape or regularity of pattern.

From a military standpoint, any object conspicuous from the air may be important, either because it may be a possible target itself or because it may serve as a landmark to assist the flier in locating military targets. The object of camouflage is to render such objects inconspicuous. For man-made objects, one of the most obvious ways to do this is to destroy color contrasts by the use of paint. Because light-colored objects seldom occur in nature, it usually follows that one of the first steps in camouflage is to "tone down" light objects with dark paints. It is the effect of this use of darker colors which is to be investigated.

Suppose, for instance, that the object is to camouflage a white building located in a park. The building is probably already partly sheltered by trees, so that its outline is somewhat concealed, but the light color stands out sharply against the green surroundings. One obvious solution of the problem would be to paint the building green to match the trees. Since foliage, because of the depth and shadow, always looks dark green at a distance, a dark green color would be chosen and

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THE PICTURES used to illustrate this article by Mr. Johnson were supplied by Harper Goff, who has distinguished himself since the outbreak of the war by designing and supervising camouflaging of factories on the West Coast, including one of the great aircraft plants. For the past three years, while carrying on as set designer and illustrator for Warner Bros. Pictures, Mr. Goff has studied camouflage and assisted in the formation of the Warner Bros. camouflage unit. He is also a well-known painter in water colors.

ABOVE

Vertical view of hypothetical manufacturing center, showing numerous bombing targets. Altitude considerably less than customary for enemy bombing.

CENTER

Same view, after low visibility camouflage paint (disruptive camouflage) has been applied. Sufficient alteration to confuse bombardier from altitude of 20,000 ft. or more.

BELOW

Identical scene after total camouflaging, consisting of nets and fabrics, plywood shapes, camouflage paint, train sheds, floats on river.

could thus achieve almost complete concealment from visual observation.

There is another thing which must be considered, however. The camera is almost invaluable for aerial observation because it records detail which the eye cannot see in the limited time available in actual flight, but which can be discovered when the pictures are studied at leisure. Furthermore, because the photographic film has different properties than the human eye, it may record things which the eye cannot see at all. For example, if a film sensitive to infra-red radiation is used, together with a filter to exclude most of the visible light, it is possible for the camera to see the landscape in terms of the invisible infra-red rays and thus bring out contrasts between different objects which the eye fails to see.

Infra-red Reflective Paints

It happens that foliage in general is reflective in the infra-red region. If a house was painted with ordinary pigments which do not reflect infra-red, it would stand out in the photograph made with infra-red sensitive film as a dark object among light-colored trees. Such camouflage would be a failure. The solution is to employ paints which will photograph the same as the trees do, and this property is achieved by proper combination of pigments in the so-called infra-red reflective paint.

No one such paint is the answer to all problems. If the building to be concealed were located in an area of bare ground which absorbs the infra-red, the use of infra-red reflecting paint would result in a photograph showing a white building in a dark background. This again is not good camouflage. The paint must match the surroundings not only in visible color but also in the way in which it reflects the invisible infra-red rays, as shown by the camera. That, in its simplest terms, is the answer to the question of when to use infra-red reflective paint. The only way to tell when infra-red reflective paint is required is to determine the character of the terrain photographically.

Paint is not the only thing to be considered in camouflage. Such is far from the truth, but a more comprehensive review of the subject is outside of the present problem. It has been necessary to emphasize the use of paint in camouflage in order to understand why the term infra-red reflectivity has suddenly become of such importance.

A very satisfactory means of measuring the relative reflectivity of painted surfaces to the rays of the sun is to mount small metal plates on a backing of insulating board, so that they can all be directed toward the sun at the same angle, and so that the heat loss from their back surface will be approximately equal. When painted with various colors, each plate will assume a temperature proportional to its heat absorption. The temperature difference between the plate and the surrounding air, as measured with a thermocouple soldered to the back of each plate, furnishes a direct simple means of determining which plate absorbs the most heat. If a black and a white plate are included in the test along with other colors, it is easy to relate the amount of heat absorbed by the colors to that absorbed by either the black or the white plate by simple proportion, and these ratios will be largely independent of minor changes in atmospheric conditions.

Table No. 1 gives the results of heat absorption tests made by the writer during May and June, 1942, in which several camouflage paints were included. The colors are described approximately by reference to the nine standard camouflage colors designated by Specification T-1213, Corps of Engineers, U. S. Army. Two coats of each paint were applied to chemically cleaned steel plates, and the surfaces were allowed to dry thoroughly before making measurements. The surfaces were, however, not weathered and no attempt was made to draw conclusions as to durability.

In analyzing the results, the aluminum was arbitrarily chosen as the standard and assigned a coefficient of one.

On this basis, the white surface, which absorbs less heat, has a coefficient of .8, and the black, which absorbs much more, a coefficient of 2.9. The other colors lie between, more or less in the same order as the darkness of tone as judged visually. Attention is directed particularly to the fact that there are no colors which have absorption coefficients nearly as low as the aluminum. Even the light gray absorbs 50% more than the aluminum, and the greens and browns, similar to those ordinarily employed for camouflage, all absorb two or more times as much as the aluminum.

TABLE NO. 1. RELATIVE HEAT ABSORPTION OF PAINTED SURFACES

Color	*Rise Above Air Temp. Deg. F.*	*Ratio*
White	25	.8
Aluminum	31	1.0
*Light gray	45	1.5
*Medium gray	54	1.7
*Light grey, approx. No. 2	63	2.0
*Green, between No. 2 and No. 9	63	2.0
*Green, between No. 2 and No. 9	65	2.1
*Earth red, darker than No. 8	72	2.3
*Earth brown, darker than No. 4	74	2.4
Dark green, darker than No. 9	85	2.7
Black	90	2.9

*Paint said to be infra-red reflective.

What is the effect of the infra-red reflectivity?

Certain of the colors are designated as infra-red reflective. This statement of the manufacturer probably means that much infra-red reflecting pigment had been incorporated as was possible consistent with obtaining the desired color. Tests made by the National Paint, Varnish and Lacquer Association (Circular 638) show reflectiveness of 10% to 52% in the near infra-red range (wave lengths 740 to 890 mμ) for typical camouflage paints, probably similar to some of those shown in Table No. 1. In spite of this, the dark colors absorbed more heat than the light ones. This simply emphasizes the obvious fact that temperature is the result of absorption in all wave lengths. Only a portion of the sun's energy is in the infra-red. Since any dark color must absorb a considerable proportion of the visible light in order to appear dark and colored, it seems likely that this effect will quite overshadow what occurs in the infra-red. Of course, if two paints have exactly the same color and tone as judged visually, it would be expected that the one having the highest infra-red reflectivity to be the cooler, but even a small difference in visual color might overcome this advantage.

Paint Usage

The whole question of the proper field of usefulness of infra-red reflective paints may be summed up by saying that the major object of using them is to achieve a proper photographic match with the surroundings. If the surroundings require it, such paint should be used.

It is of interest to note the temperature differences observed and recorded in the table. These temperatures represent the probable maximum rise above air temperature for objects painted as indicated and exposed normal to the sun's rays, assuming the objects to have low heat capacity, and no means of cooling other than natural convection to the air. The figures were obtained under average coast conditions of wind and atmospheric humidity. They will undoubtedly be exceeded slightly during periods of dead calm or extremely clear atmosphere.

Actual objects, such as tanks, which have a high heat capacity, do not ever reach equilibrium conditions. Small objects, such as pipes, may quite readily approach the temperatures indicated.

A pressure of over 2000 lb. psi. can easily develop in a closed length of liquid-filled pipe as a result of the heat of the sun. The power of the sun's rays cannot be ignored.

Paint offers one of the most important ways for modifying the effect of the sun's rays. If a color darker than white or aluminum is employed, an increase in temperature is bound to result. In some cases an increase in the temperature of gasoline plant equipment will do no harm. In others it will result in an increase in evaporation loss, which can be important but not vital. In some few cases even a small increase in temperature may be very important, as, for example, where a vessel is operating close to the relief valve setting. The plant engineer must be able to predict the effect of temperature rise in any part of the plant if unexpected results from camouflage painting are to be avoided.

Herewith a summary of the paints covered:

1. The use of dark camouflage colors instead of white or aluminum is likely to increase by at least two-fold the heat absorbed from the sun's rays.

2. The temperature increase which results will depend on the nature of the equipment. The effect of the increase will depend on circumstances which must be evaluated independently for each part of the plant.

3. The property of infra-red reflectivity in camouflage paints makes it possible for a painted object to match *certain types* of surroundings both visually and when photographed with filter and infra-red sensitive film.

4. The principal justification for the use of infra-red reflective paints arises from the photographic quality of the paint as compared to that of the surroundings, and to use such paint where not needed would yield only minor advantage in decreased temperature.

Gas Heating Cabinet Dries Plane Engines in Four Hours

By E. H. ADLER

Industrial Gas Engineer
San Diego Gas & Electric Company*

AIRPLANE engines are sprayed, inside and out, with a heavy coating of oil to protect against corrosion in transit or storage. They are fully equipped and ready for operation, with magneto, carburetor, spark plugs, wiring, etc., all installed and connected.

The aircraft plant must further equip these engines with exhaust manifold, heaters, tail pipe and cowling. To insure proper operation, each engine must be "turned over" before delivery to final assembly. The heavy oil coating must not only be removed from outside surfaces, but any accumulation inside the cylinders must be eliminated. Due to extremely small compression space, drops of thick oil may break cylinder or piston heads.

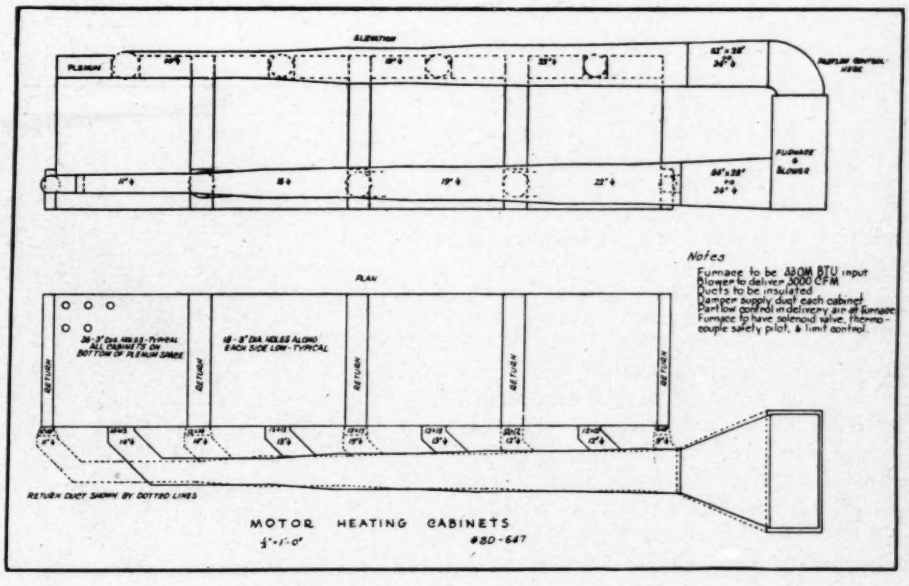
Engines are taken from their shipping boxes and placed on racks with casters (dollies) to form the assembly line. Previously they were sponged off by hand with cleaning solvent to remove the outer coating of grease. Now the dollies and engines are pushed into individual heating compartments. These compartments are held at a temperature of 160° F. by a re-circulated air system. This temperature is low enough to insure no damage to rubber or plastics, but does thin the protective coating sufficiently to clean the engine, inside and out, in about four hours. Upon removal and cooling, the motors are ready for the manifold and cowling assembly.

The cabinets, four in a group, are supplied with re-circulated warm air through a system of ducts. The top of each cabinet has a warm air plenum with 3-in. holes for uniform distribution of heated air to the interior. Spacing these chambers 12 in. apart allows room for a return duct from both sides with additional ducts for the compartments on each end.

The furnace recommended is a standard forced air package unit. Since the bonnet temperature is fairly low, a cast iron heating element will offer longer life. The bonnet is equipped with a throttling control to maintain air deliveries at 160°. Safety controls consist of thermo-couple type pilot, limit switch and solenoid valve.

The cabinets are double wall plywood with a floor pan to catch the oil drippings. Duct work may be made from building materials, since the operating temperature is low enough to be safe. System friction can easily be kept below .25 in. of water, static pressure with an air delivery of 3000 cfm. A furnace input of 300,000 Btu. is sufficient to maintain temperature under indoor conditions and time requirements.

Aircraft plants have many applications of a nature similar to this. Many departments require dryers, lacquer ovens, or low temperature ageing and normalizing operations.



*Gas Utilization Data Bulletin No. 110, issued by the Pacific Coast Gas Association in February, 1943.

GAS HOLDER CORROSION

By M. FRANK KNOY

Combustion Engineer, Municipal Gas Department, Long Beach, Calif.

IN THIS discussion of corrosion in the tank of a water-sealed holder, Mr. Knoy has developed a somewhat new approach to the problem of water treatment, based on electrochemical theory fitted neatly into observed phenomena of water analyses and tank bottom pitting. Instead of attempting to retard corrosion by maintaining the water at a definite alkalinity by use of dissolved salts, the author proposes to keep the water as near neutral as possible, with a minimum saline content, and thus prevent elecrolytic flow of current (and consequent pitting) by lack of water conductivity and back pressure of dissolved iron.

THE 500-Mcf. holder No. 1 of the Long Beach Municipal Gas Department was erected in 1911. It was filled with typical Long Beach well water at the time, and was never emptied until 1939. The original water was slightly alkaline.

Various analyses of the water are reported in Tables 1 and 2.

On the assumption that alkaline water was desirable, on May 11, 1937, we dissolved and added chemicals as follows: 950 lb. soda ash, 250 lb. sodium meta silicate.

According to small scale tests on samples of holder water made by our city chemist, this was sufficient alkali to raise the PH to 8.5. But, after waiting a few weeks for the salts to diffuse thoroughly, a sample tested Aug. 24, 1937, showed a PH of only 7.6.

In the light of subsequent experience, we now know that the PH was likely raised to something over 8, but had dropped considerably by the time it was sampled in August.

On Oct. 27, 1937, we added, again, 1000 lb. soda ash and 250 lb. of soda meta silicate. This should have brought the PH up to well over 8. But again we waited to allow for diffusion of the salts, and on Jan. 28, 1938, the PH reading was 8.0.

By April 28, 1938, this had fallen to PH of 7.4 again, and on July 29, 1938, it was 7.3. And on Oct. 29, 1938, it showed once more a PH of 7.3.

Another treatment of 1000 lb. soda ash and 300 lb. soda meta silicate was added Dec. 23, 1938. A test on Jan. 23, 1939, showed a PH of 7.8, but by May 1, 1939, this had dropped to 7.2, and on July 13, 1939, it tested 6.9.

Allowing for a possible error of .1 in any given PH reading, we can see that there is a decided tendency for the water to drop from a PH of 8, or better, back to, or nearly to, the neutral point. Based upon this record, it would seem almost hopeless to try to keep the PH up by the addition of these particular chemicals.

Needless to say, we were greatly surprised at the rapid decline in PH value after each treatment. Of course, we realize that the precipitation of hydroxyl ions by ferrous and ferric ions would have a tendency to lower the PH. Also, the possible absorption by the holder water of CO_2 from the stored gas would have the same tendency. But we did not foresee that the drop would be of the rapidity and magnitude observed. We have no information as to whether other factors may be involved in this rapid loss of alkalinity.

Since our experience with two other holders was substantially the same with regard to the tendency to revert to the neutral condition, we decided in the summer of 1939 to abandon our efforts at PH control by the use of these chemicals. It seemed to us rather futile, since we never attained the high PH which laboratory tests indicated we could expect, and since it seemed to revert almost to the neutral point in a few weeks.

TABLE 1
January 30, 1933

Item	*Parts per Million*
Alkalies as sodium carbonate	192.9
Sulphuric anhydride	Trace
Chlorine	47.0
Dissolved oxygen	5.0

TABLE 2
December 31, 1936

Item	*Parts per Million*
Silica	2.5
Iron and aluminum oxide	13.5
Calcium carbonate	43.9
Calcium sulphate	.7
Calcium chloride	.....
Magnesium carbonate	36.4
Magnesium chloride	.....
Magnesium sulphate	.9
Sodium carbonate	63.6
Sodium sulphate	.2
Sodium chloride	74.2
Loss on ignition	126.0
TOTAL NET SOLIDS	361.9
PH	7.1
PH May 3, 1937	7.0

Subsequent events and observations as follows have made us doubt the wisdom of any attempt at PH control:

About March, 1939, we noticed that a leak had developed in the bottom of holder No. 1. In July it was taken out of service, inspected and repaired.

The inner walls of the tank and lifts, where accessible for inspection, showed moderate but dormant local action pitting. No deep or active pits were found.

The bottom was partly covered by tar and wax from the manufactured gas that was handled during the first years of use. The area covered extended for a distance of about 10 ft. inward from the tank sides all the way around. This area was not pitted at all, possibly due to the covering of tar and wax ranging up to several inches in depth.

The circular area inside this covered zone was seriously and extensively pitted throughout. The pits were not by any means uniformly distributed, as some sheets were pitted more seriously than others, and even different parts of the same sheet were affected to a different extent. But, considering the bottom as a whole, it was seriously pitted throughout.

Moreover, in certain areas the pits were very bright and active, with no rusty or dormant areas in between. Entire patches of plate, of several square inches in area, were bright and active.

Some of the deeper pits were already through the ¼-in. plate and many others were almost through. Yet we found many deep old dormant pits which were still covered with napthalene deposited from the manufactured gas and hence must have formed and become dormant more than 20 years ago. Some of the old pits were just beginning to get active again and were active around the edges but still had a solid plug of iron oxide in the center and bottom.

In short, it looked to us like a case of original local action pitting of the bottom and sides, having been dormant for many years and having become active again more or less recently on the bottom only.

A dark green sludge of ferrous hydroxide was present on the tank bot-

tom, indicating active solution and precipitation of iron.

The question naturally arose as to why pitting should be active on the bottom only. Since we must assume similar material throughout the tank, and since all submerged surfaces were exposed to the same solution, the question seemed all the more baffling.

According to the electrochemical theory of pitting under water, the center or bottom of the pit is anodic toward some other part of the submerged surface, called the cathodic area. During corrosion there is a more or less feeble flow of electric current through the covering solution or electrolyte, from the anodic area to the cathodic area. This current returns through the metal from the cathodic area to the anodic area, thus completing the circuit. In leaving the anode, the current will, under certain conditions, take metal ions into solution continuously.

If the cathodic surface is that portion of metal directly surrounding the pit, it is called local action, and each pit will be surrounded by a dormant or rusty area; while, if the pits and intervening areas are equally active, as we found on the tank bottom, it can no longer be called local action but is true electrolysis, and we must look for a cathodic surface more or less remote from the active area.

Our problem, then, is to ascertain where our cathodic surface is and why it is in that relation to the tank bottom. If a case of electrolysis exists, which it obviously does, what chemical and electro-chemical factors are present to explain it?

According to Speller,* different parts of a submerged surface may have different potentials, from either of the following causes:

1. Different metals in contact with each other and bathed in the same solution.
2. Similar metals, or the same metal, bathed in different solutions.
3. The same metal bathed in the same solution but having a different concentration at different points.
4. The same metal covered by the same solution but having a different oxygen content at different points.

In assigning a cause for a potential difference in different parts of the tank in question, we can rule out Nos. 1 and 2 above, since we assume similar steel throughout the tank, bathed by the same solution.

As to No. 3, there may have been a higher mineral content of the solution near the tank rim when the salts were first added, in which case this area would be cathodic so long as a marked difference in concentration existed. But since the salts added were in moderate quantity and highly soluble, we should not expect any marked concentration effect to continue over a period of months or even years. However, if mineral salt concentration was a factor in the case, it would have been such as to give a potential differential in the direction observed.

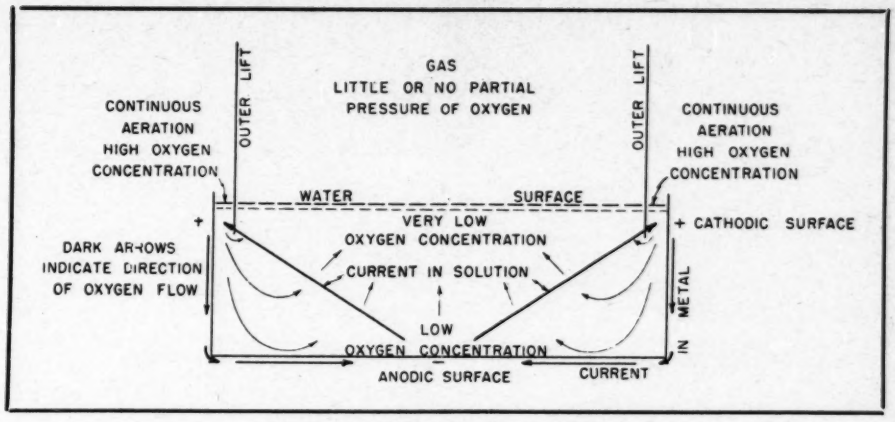


FIG. 1. Section through Holder No. 1.

Among the possible causes of electrolysis listed above, it is our opinion that No. 4 supplies a decisive clue. It has been established by numerous tests that if the same metal covered by the same electrolyte is supplied with oxygen in solution at one part and deprived of it at another, the aerated surface will become cathodic to the deaerated portion. To quote Speller: "Areas which are shielded from oxygen in any way become anodic to areas which are in contact with solutions richer in oxygen."

Turning our attention now to the gas holder diagram shown in Fig. 1, it is easy to visualize these conditions:

1. The surface water around the tank rim outside the lifts will be fully aerated at all times, and hence rich in oxygen.
2. The surface of the water inside the lifts will be very low in dissolved oxygen, since it will be exposed to the gas at all times. This gas has little or no oxygen partial pressure and is as effective for deaerating the water as would, say, a 29-in. vacuum.
3. The dissolved oxygen at the holder rim would naturally diffuse in the direction indicated by the arrows from the points of higher concentration toward those of lower concentration.
4. While perhaps containing some oxygen, that part of the solution lying on the tank bottom would contain far less than that part at the rim.

That there was actual oxygen deficiency at the bottom and center, in our case, is indicated by the obvious ferrous condition of the deposits. If plenty of dissolved oxygen had been present, the sludge would have been ferric hydroxide of a red-brown color. In fact, on water samples collected near the rim, we always find ferric hydroxide in suspension, never ferrous. But we found only or mostly ferrous iron on the tank bottom when it was emptied. This fact alone would tend to establish a difference in oxygen concentration in different parts of the solution. See Table 1 for dissolved oxygen content near the rim.

Being convinced that we do in fact have an oxygen concentration cell and, hence, electrolytic action, let's follow the cycle in detail.

By reference to Table 2, we see that, even before the addition of extra salts, the holder water carried sufficient solids in solution to constitute a weak electrolyte. The 3800 lb. of salts added would represent an additional 310 parts per million of solids, and thus greatly increase the conductivity of the solution. This solution, then, together with the metal of the tank sides and bottom, will constitute an electric circuit with current flowing in the direction indicated in Fig. 1.

If the electrolyte is alkaline, as in our case, during the treatment period, iron ions will go into solution at the anodic tank bottom and cause pitting, as observed. Since the solution is rich in hydroxyl ions, the iron ions will at once be changed to ferrous hydroxide and, as further diffusion occurs, to ferric hydroxide, as also observed, Fig. 2.

With the ionic iron thus neutralized electrically, the positive charges originally carried by it will be taken over by hydrogen ions and discharged at the cathodic tank rim. This would soon result in hydrogen polarization at this point and a possible stopping of the reaction, if it were not for the fact that the solution here is rich in dissolved oxygen—the best depolarizing agent.

Since there is plenty of hydroxyl ions in solution to precipitate the iron as fast as it dissolves, and since there is sufficient oxygen present at the cathode to keep it depolarized, we have no

*See "Corrosion Causes and Prevention," by Frank N. Speller, D. Sc., director of metallurgical Department, National Tube Co.

factor present that would tend to halt the reaction.

On the contrary, there are two factors that would have a definite tendency to aggravate conditions and actually facilitate or increase current flow. Since we are dealing with an oxygen concentration cell, anything which reduces the oxygen concentration at the anode, or tank bottom, or which increases it at the cathode, or tank rim, will cause an increase of current. Since the water surface at the tank rim is continuously aerated, we may assume its oxygen content to remain constant. But at the tank bottom, this will not be the case. As fast as ferrous ions go into solution, they will react with dissolved oxygen to form ferric iron, thus constantly depleting the oxygen supply and producing an even greater difference in oxygen concentration between anodic and cathodic areas. This will, of course, cause an increase in current flow. Yet the greater the current flow, the greater the amount of iron going into solution and the greater the depletion of oxygen at the anode. Thus we have here a self-sustaining cumulative effect.

Now the question arises as to what can we do or what condition we can produce to interfere with this cycle and halt the dissolution of iron on the tank bottom. Obviously, we shall always have here the elements of an oxygen concentration cell, due to constant aeration at the tank rim and constant deaeration at the tank center. We must, therefore, expect a small potential to exist and a small current to flow between the tank bottom and the tank rim.

But, thanks to another law of electrochemistry, we may, under certain conditions, have this flow of current without the loss of any iron. Just as there is a certain solution pressure tending to force the iron ions into solution, there is also a solution back pressure which, with an increase in the amount of dissolved iron, tends to prevent the solution of any more.

As pointed out above, an alkaline solution neutralizes the iron ions as fast as they form by converting them into ferrous or ferric hydroxides. But this reaction can occur only in an alkaline solution. In a neutral or slightly acidic solution, less hydroxides will form, less iron will be precipitated, and its ionic concentration in the solution will increase. When this concentration becomes high enough to cause a solution back pressure or counter voltage as high as the voltage of our oxygen concentration cell, no further solution of iron will occur.

A feeble current may still flow with a small and harmless electrolysis of water, very similar to the action in passing charging current through an overcharged storage battery. In either case, a chemical condition has been attained in the electrolyte wherein there is a flow of current but no displacement of metal ions.

Since the voltage involved is small, being only a fraction of a volt, the amount of ionic iron required in solution to produce an equal counter voltage need not be very great.

According to the evidence and the above deductions, there were three distinct electrochemical periods in the life history of holder No. 1. These electrochemical periods may be described as follows:

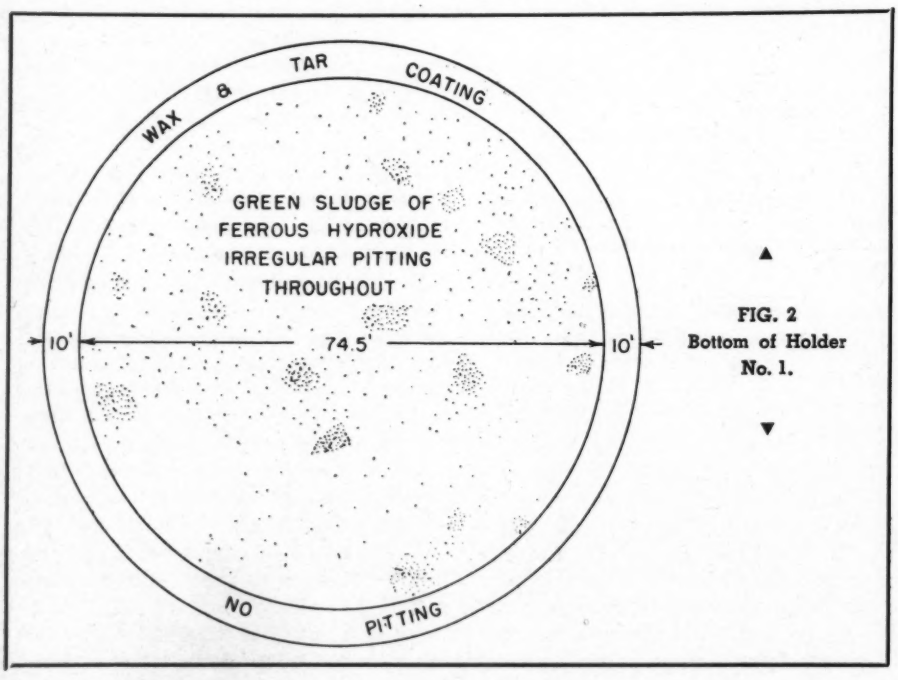


FIG. 2
Bottom of Holder No. 1.

First Period: During which the water was slightly alkaline. The oxygen concentration cell effect caused quite a bit of electrolytic pitting, accounting for the old, deep but dormant pits which we found on the bottom. As the water lost its alkalinity (see the PH curve, Fig. 1), and approached the neutral point, the electrolytic solution of iron ceased, due to iron ions remaining in solution. The first period lasted from the time the holder was filled with alkaline water until the water dropped to or near the neutral point, possibly several months, or even a few years.

Second Period: During which there was no electrolytic solution. The electrolyte was neutral and remained charged with iron ions. A slow and harmless local pitting, due solely to dissolved oxygen, was likely present. This second period lasted from the time the water became neutral and charged with iron ions, say about 1914, until alkalization was begun in 1937.

Third Period: This period lasted from the first alkali treatment May 11, 1937, until the holder was taken out of service in July, 1939. During this time the solution of iron proceeded very rapidly, due to the virtually complete precipitation of iron ions by the alkalinity, as fast as they dissolved; and due further to the better conductivity of the electrolyte from the addition of more salts.

The actual conditions found, as listed above, gave credence to the view that solution and precipitation of iron had been rapid during this last period.

Of the three periods listed above, it is our present belief that period No. 2 was the time during which the holder suffered the least deterioration. In other words, since we have an oxygen concentration cell in any wet gas holder, it is safest when the water has the lowest possible conductivity and, therefore, the lowest possible mineral concentration, and when the water remains at or near the neutral point so that iron ions may remain in solution in sufficient concentration to supply a solution counter voltage high enough to prohibit further dissolution of iron at the anodic tank bottom.

To put it briefly, we doubt the wisdom of holder water alkalization.

When we put the new bottom in holder No. 1, we applied a coating of hot pitch enamel approximately $\frac{1}{4}$ in. thick. This was tested electrically and found to be without breaks and nonconducting. It is our belief that this coat should effectually keep the water from physical or electrical contact with the tank bottom and thus prohibit either local action or electricalytic pitting.

The bottom coating we placed in holder No. 1 will doubtless protect the bottom, but may leave the lower side areas open to oxygen cell electrolysis.

A remedy which it seems might prove practical and effective as a holder tank protection on new holders would be to cover the entire inner surface of the tank with an impervious coating such was used in the bottom of holder No. 1.

The Wartime Tasks of INDUSTRIAL and COMMERCIAL GAS

(A Symposium)

6. Small Air Conditioning Installations

GEORGE ELMER MAY, utilization engineer, New Orleans Public Service, Inc., and chairman, AGA Technical Advisory Committee on Gas Summer Air Conditioning Research. Excerpts from a paper, "Air Conditioning Small Commercial Establishments With Gas."

THE utilization of gas for year-round air conditioning has grown steadily during the past several years and has attracted much interest within the industry. Many papers have been written on progress in applying small year-round conditioners to the residential field, but little has been said about the interesting commercial market for such equipment. Over 50% of the experience in the south was had with the commercial field.

During the past three years, 27 gas utilities have made hundreds of gas air conditioning installations throughout this country. Reports from all sections support experiences in the south, and indicate that the equipment gives a good account of itself. In the southern areas served by United Gas Corp. and New Orleans Public Service Inc., 103 out of a total of 166 units were installed in commercial establishments; which installations represent in excess of 200 unit-years of satisfactory experiences. There is ample proof that the equipment is proved and acceptable.

Character of the Commercial Market: The commercial market for gas air conditioning has interesting characteristics quite different from other fields. In fact, it is almost unique.

Here is a market *already* developed by the electric industry where appreciation of need and value of air conditioning is well established, and where one sale practically forces another. In this market, investment cost and operating expenses are not considered luxuries, but are classed as normal business necessities.

The salesman emphasizes particular type of equipment being offered and confines his attention to showing commercial prospects how the place may be conditioned and the advantages his system has over other methods.

Analysis of the Commercial Market: Consideration will be given first to *where* the equipment has and can be installed, and second to *what extend* the commercial market may reasonably be expected to expand in the future.

Installations have been made in nearly every one of the following classes of establishments:

1. Apartments.
2. Banks (small).
3. Clubs (sections).
4. Clinics.
5. Offices: Professional, private, general.
6. Shops: Apparel, barber, beauty, book, fur, sandwich.
7. Stores: Candy, drug, grocery, jewelry, hosiery, shoe, sporting goods.
8. Studios: Art, broadcasting.
9. Special: Research.

In general, the commercial market under consideration comprises all establishments with relatively small heat loads from people and moisture. This eliminates funeral parlors, restaurants, cafeterias as suitable applications for small gas air conditioning equipment of present design.

It is very encouraging to learn of the past growth in acceptance of gas air conditioning in commercial establishments, and at this time, many plans are being made toward the future for such equipment.

Certain definite trends have been established for commercial acceptance of air conditioning by the electric industry and furnishes an interesting base for predicting future growth of gas air conditioning. Fig. 1 indicates growth of electric air conditioning since 1933, expressed in terms of installed capacity. While these data are for New Orleans only, it generally is representative of the rate of growth elsewhere. Assuming no further growth during the war, it is reasonable to expect a sharp increase for the first several years following the war's end, so that at year X+2, the rate of increase will probably exceed that prior to Dec. 7, 1941.

It is expected that this growth will be further accentuated by the need for replacement of worn out and obsolete electric equipment, and there, gas should have many natural advantages.

Characteristics of Commercial Air Conditioning Systems: Design and installation of a commercial air conditioning system is relatively simple compared with other types. This is a result of many factors, the more important of which are listed below. As a result, commercial installation costs are lower than others, expressed both in terms of cost per sale and system cost.

Psychrometric requirements are not too exacting so that the control elements are reduced to a very minimum. With frequently opened doors, and the great variance in ideas of comfort between employee and customers, no fine control over temperature or humidity is justifiable.

Particularly in small stores, offices, etc., the air distribution system often consists of no more than a single supply and return grille in a back wall close to position of the conditioner. Short ducts, with a minimum of insulation, involving simple design, effect a minimum in cost of materials and labor. Then too, the location of the conditioner is often the site of adequate water, electric and gas services, so that a minimum in plumbing and wiring is needed to "connect up" the unit.

Careful design of costly acoustic treatment is seldom required because

PRESENTED ON these pages are excerpts from some of the papers delivered before the American Gas Association War Conference on Industrial and Commercial Gas held by the Industrial and Commercial Gas section in Detroit, Mich., March 11 and 12, 1943. Abstracts 1 through 5 of the papers presented before the industrial conference were published in the April issue of GAS, pp. 35-40.

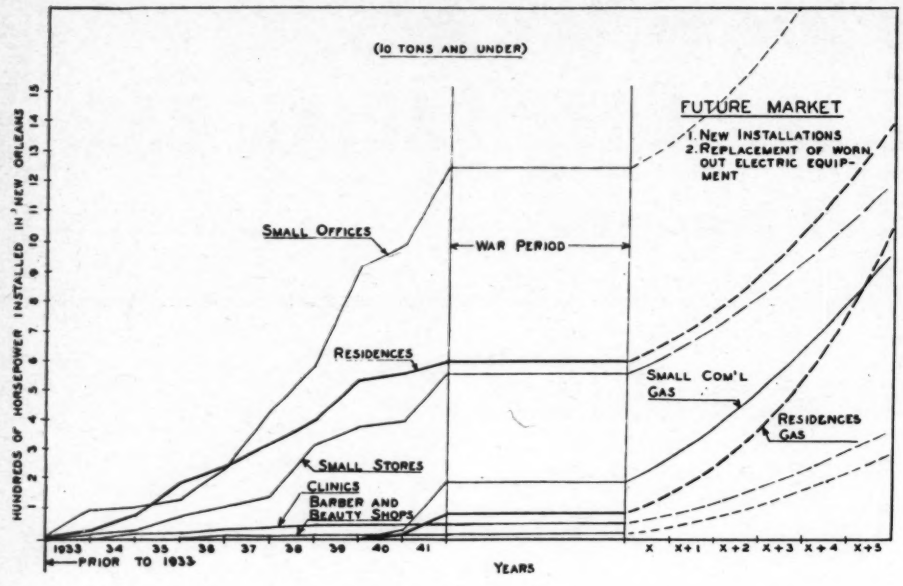


FIG. 1. Acceptance of air conditioning in New Orleans by class as indicated by growth in refrigeration capacity installed.

of normal high background noise levels generally found in commercial establishments. Likewise, since appearance is not of prime consideration, exposed duct work is often acceptable and expensive decorating seldom required.

All of these items have a favorable effect on investment cost, which has been calculated as $378 per ton for commercial installations as compared to $462 per ton for residential installations.

Another interesting characteristic of many commercial systems is that their operating time and cost are not greatly influenced by the weather, such as in the case of a residence.

Buying Motives and Commercial Sales Appeals: Experience in selling air conditioning to commercial establishments has taught that special, well suited sales appeals must be used which do not apply to other markets. The buying motives which have been found most effective are listed in Table 1 in their order of importance and are shown in contrast with those which are considered best suited for the residential market. The difference in character between the two groups is quite sharp and interesting.

Of even greater interest are the buying motives which have influenced selection of gas air conditioning equipment. They are summarized below, in their order of importance, according to experiences with commercial establishments in the south.

1. Heating and cooling from one unit.
2. Simple control for seasonal changeover.
3. No moving parts and long life expectancy.
4. Cleanliness of gas as *one* fuel for all seasons.
5. Replacing obsolete heating equipment.
6. Compactness.
7. Silent operation.
8. Seldom requires enlargement in utility services.

The owner is interested in item No. 8 because it saves unnecessary costs to enlarge electric, gas or water services.

The utility is particularly interested in item No. 8 because no further investment in service is required in order to create additional gas revenue.

TABLE 1. SALES APPEALS FOUND MOST EFFECTIVE

Residential (Personal)

1. Comfort.
2. Health.
3. Cleanliness.
4. Noise elimination.
5. Personal efficiency.
6. Privacy.
7. Aid to convalescence.

Commercial (Profit)

1. Increased patronage.
2. Increased sales per patron.
3. Overcome seasonal slump.
4. Loss reduction.
5. Cleanliness.
6. Advertising value.
7. Prestige.
8. Good will.

7. Electrolytic "Detearing" Process

HAROLD P. RANSBURG, Harper J. Ransburg Co., Indianapolis, Inc. Excerpts from a paper, "Dipping as Augmented by Electrolytic 'Detearing' Process and Its Effect on Better Baked Finishes."

THE many changes that have taken place in the art of industrial finishing have necessitated a close study of the new processes on the part of industrial gas engineers. There are certain processes, improvements which augment the quality of product now being produced in gas heated equipment.

Such a finishing process is the dip process which, however, has been handicapped by difficulties experienced at the "drain-off" points. Experience has indicated that no matter how efficient an oven is, the final finish is not always that desired because of the difficulty of uniformly removing this excess material before baking. This discussion therefore is for the purpose of explaining a new electrolytic "detearing" process which is being applied successfully and which has resulted in a better product being produced when subsequently baked in gas ovens.

In the operation of this process, the article is dipped in any suitable manner, then proceeds along a conveyor over a drainboard, and is permitted to "air dry" or "set" sufficiently that the coating material has practically ceased flowing. At this stage the section from which the paint has been dripping, which we call the "drain-off" point, is subject to an electrostatic field which is designed to set up an attractive force between the grounded article and a high voltage electrode which is properly spaced from the object.

The electric field is energized by an especially designed power pack which produces a half-wave D.C. current of very small magnitude. This unit is so designed that on a dead short it will not produce more than 5 milliamperes. In a normal application it will produce in the neighborhood of 200 microamperes at 85,000 volts. It is a self-contained, oil-immersed unit, with no moving parts. It requires a primary current of 220 volts, 60 cycle, approximately 3 amperes.

Probably the most interesting aspects of this problem to heating engineers will be in its effect on baking requirements. There undoubtedly will occur other interesting ramifications on the effect of the new excess material removal process on bake oven requirements which would be more obvious to those in industrial gas authority in that field.

8. Outlook for the Post-War Period

C. V. SORENSON, Northern Indiana Public Service Co., Hammond, Ind., and member, AGA Post-War Planning Committee. Excerpts from a paper, "Improving the Outlook for Industrial and Commercial Gas in the Post-War Period."

A DISCUSSION of ways and means to increase the volume of industrial and commercial gas sales and revenues when the war is over may, perhaps, be best summarized by examining the opportunity of the industrial department in an individual territory.

1. It can determine the general type of industry which exists in the area and what type of business activity will benefit local industry to the greatest extent, i.e. home building, industrial construction, civic rehabilitation, consumer durable goods, Public works, etc.

2. Determine how probable national business trends will affect the area in question. For example, consumer goods, such as automobiles and refrigerators, will directly affect Detroit and the steel producing areas. An extensive replacement of railroad cars and motive power would maintain employment in definite areas, and if the post-war home is put on a production line basis, certain other industries and areas will benefit.

3. What is the industrial man learning from experience with gas in war industries and how can that information benefit local industry? How has it performed in new applications—what about oven designs and controls? What place will there be for industrial gas in the production of plastics—magnesium and aluminum?

4. Knowing what industrial gas can do and anticipating probable business trends, what will be the normal expectation for gas sales in the area?

5. If the above does not reflect a satisfactory volume, is there anything the company should do to promote greater industrial diversity in its territory?

Analyze the natural advantages of the territory in question, such as: labor, natural resources, shipping facilities, availability of markets, housing, and schools.

Based on these and the probable general industrial trend, can the company help promote industrial activity that is not now common in its area? This may lead the industrial man somewhat afield from his normal activities, but he is well equipped by training and experience to judge the industrial possibilities of his territory.

The commercial field also presents opportunity for much constructive work some of which can be outlined as follows:

1. Visit all commercial customers explaining how to make present equipment last and give the best results, and at the same time make a complete market analysis of the commercial field.

2. During the visit find out what the user demands of his equipment, i.e.,

A. Style or design. Where will it be placed? Will the customer see it? Will style help sell its product?

B. Limitations placed by economics and competition on first cost and necessary terms of purchase.

C. Allowable cost of operation (including depreciation). In terms of cost per unit produced.

D. The work or product it must turn out. Will it help sell its product easier than competition can? How must it perform against competition?

E. Accessibility for service and maintenance.

3. The above data on customer preference and demands could be collected from the member companies by a committee of this section and resolved into a composite for each type of equipment and the number of models or sizes necessary could be determined.

This information passed on to manufacturers would be invaluable in the production of post-war commercial equipment.

A. It will allow the manufacturer to more accurately gage the size and kind of the post-war market.

B. It should give the customer a piece of equipment that will more nearly suit his needs, increasing satisfaction with gas.

C. It should greatly enlarge the market of the gas company and reduce the cost of sales coverage.

4. During the visit learn from the customer the requirements placed on fuel used for each job or application where fuel is required and determine if the business is desirable. If the business is desirable, review, (1) the necessary rate schedule, (2) the kind and type of equipment available in normal times, (3) necessary manpower for territory coverage, (4) required sales and advertising approach.

5. Determine the effect of expansion or contraction of post-war general business on the commercial gas revenues, as an aid to management in making its forecasts.

6. Determine the customers equipment that will need immediate replacement after the war. This information should be made available at least in total to manufacturers.

7. From the above arrive at: (1) Replacement market for worn out and obsolete equipment, (2) market for replacement of competitive equipment, (3) new equipment market in new establishments if general business continues at present levels or expands, (4) new uses: air-conditioning, commercial refrigeration, space heating.

Increases in California Utility Rates Deferred

THE Railroad Commission of California approved April 27 a request from the state's natural gas companies to defer increases in retail gas rates which would have become automatically effective April 1 when OPA in Revised Price Schedule No. 88 allowed a 25% increase in the price of fuel oil. The OPA at the same time froze the rate at which utilities purchase gas from producers.

It is estimated that between $4,000,000 and $5,000,000 will be saved gas consumers annually as a result of the deferment, according to Roy A. Wehe, gas and electric engineer for the commission. The bulk of such savings will go to the large industrial and commercial users of gas.

The commission's order granting the deferment of increases contained provisions that such deferment should not be effective longer than 30 days following the termination of OPA's order. The commission also retained the right to modify its authorization as future conditions might dictate.

For the past several years the price of fuel oil in California has been stabilized at 85¢ a barrel, the 25% increase boosting the price to about $1.10. Many of the gas utility purchase contracts call for sliding price schedules based on the price of fuel oil. In addition, contracts for the retail sale of gas call for a price increase of 1/6¢ for each 1¢ rise in the price of fuel oil. Since the price of gas at the well was frozen, the utilities and the commission both advanced that it was in the best public interest to waive contract clauses calling for increased retail rates.

While this deferment is in line with the President's program to control inflation, it does increase the spread of certain price differentials between customers using oil and gas. There are many large industrial customers in the state that pay from 10½¢ to 15¢ per Mcf. of gas, a rate more favorable than the former fuel oil price of 85¢ to 90¢ per bbl. The 25% increase in fuel oil may give a large low rate customer a 90% price differential over oil.

Briefs of Washington Orders

Utilities Order U-1 (a), as amended April 17, 1943: The amendments to this order provide in general the following:

1. *Preference Ratings:* (1) For maintenance, repair and operating supplies a rating of AA-1 is assigned, including controlled material class A and B products. (2) For construction of transmission and distribution facilities to serve rated projects, the lowest rating assigned to the project is in effect.

2. *Assignment of CMP Allotment Symbol:* The symbol MRO-U is assigned to orders for controlled materials, except aluminum, for use in maintenance, repair or as operating supplies. An order bearing the MRO-U symbol will have the same status as an order bearing an allotment number under all applicable CMP regulations.

Aluminum may be acquired on specific application to WPB, Office of War Utilities, ref. U-1; in amounts not exceeding 100 lb. per quarter (CMP Reg. 5); from another producer upon proper preference rating.

3. *Application of CMP Allotment Symbol:* The ratings assigned by the order may be applied only by use of a certification in lieu of endorsements specified in Priority Regulation 3 and CMP Regulation 5. No preference rating need be applied to an order to be placed with a controlled material producer.

3. *Withdrawals from Inventory:* Withdrawals may be increased in any calendar proportional to the increase in system output in the 12 months' period preceding the current quarter over the system output in calendar 1942. Fluctuations in seasonal requirements for materials are taken care of in the amended order.

5. *Sales from Inventory:* Such sales are prohibited except as provided in Priorities Regulation 13, to fill a rating of AA-3 or higher, by specific direction of WPB, to a producer from which the material was purchased, to a scrap dealer, to a used equipment dealer, to a government agency.

All material in the inventory of any producer shall be carried on the producer's own records and be reported to WPB as may be required.

■ ■

CMP Regulation 5. Purpose of this regulation is to provide a uniform procedure for obtaining maintenance, repair, and operating supplies, both in the case of controlled materials obtained by use of allotment symbols under CMP and in the case of materials obtained by preference ratings. Public utilities: gas, light, power, water, and central heating; and petroleum and natural gas production, transportation, refining, and marketing (except retail) are specifically mentioned in Schedules I and II attached to the order.

■ ■

Stove Rationing

RATIONING of the nation's new cooking and heating stoves burning gas, oil, coal and wood is scheduled to begin June 15, according to an announcement May 19 by the Office of Price Administration. It is estimated that American factories will produce such stoves at the rate of 3,500,000 units per year.

Those who need cooking or heating stoves may apply to OPA ration boards in June. Applicants must show that the new stove will be used in essential living or working quarters, that the present stove is worn beyond repair, or that they have no stove and that no stove has been disposed of within 60 days.

Production of new cooking and heating stoves in 1940-41, a normal year, was 8,600,000, cutting down production by 5,000,000 units.

While no definite word has come from WPB on amendments to Order L-23-c which would allow resumption of production of stoves by manufacturers restricted from such production last July, it is rumored that some such action will be shortly taken. The restricting order prevented the manufacture of cooking and heating stoves by manufacturers in labor shortage areas or who were doing more than $2,000,000 gross business per year.

While some victory model stoves have been produced by smaller manufacturers located in non-labor shortage areas, it is not generally conceded that their production has been in volume to adequately care for the nation's needs under the rationing program. It is likely that the production restrictions will be lifted to allow certain manufacturers strategically located to resume production of one of their regular models stripped of accessories.

It is thought also that steps will be taken toward resumption of the production of water heaters, and that a rationing program for this appliance will shortly be put in effect.

THEY GAVE THEIR ALL

Aviation Cadet **Billy G. Elliott,** 24, was killed in a plane crash March 17 near Bay City, Texas. Employee United Gas Pipe Line Co.

Private First Class **John K. Evans,** United States infantry. Killed in action in the Southwest Pacific area. He had received the Purple Heart medal for "military merit and for wounds received in action." Employee Pacific Gas & Electric Co., San Francisco.

Private **Troy T. Gustafson.** Killed in action at Guadalcanal on Jan. 14. He was winner of the Purple Heart medal which, adorned with three stars, has been presented to his mother. Employee Southern California Gas Co.

Ensign **Herbert Tutwiler, Jr.,** 31, killed in a plane crash at Plain Dealing, La., 20 miles from Shreveport, his former home, on April 11. He had seen almost a year of combat sea duty in the Southwest Pacific and was on his way home on leave. Employee Arkansas Fuel Oil Co.

LP-Gas Section Transferred To PAW Natural Gas Division

FORMATION of a liquefied petroleum gas section in the Division of Natural Gas and Natural Gasolines was announced May 3 by Petroleum Administrator for War Harold L. Ickes.

Headed by Paul K. Thompson, the personnel of the section was transferred without change from the War Production Board, where the handling of distribution problems of liquefied petroleum gases came under the jurisdiction of WPB's Plumbing and Heating Division. Details of the transfer to PAW were arranged by War Production Board Chairman Donald Nelson and Deputy Petroleum Administrator Ralph K. Davies.

The section continues the functions for which it was responsible in the WPB, principally the administration of WPB's Limitation Order L-86 which regulates the installation of liquefied petroleum gas equipment.

Liquefied petroleum gases affected by the L-86 order are butane, propane and mixtures of these two hydrocarbons, which are used as fuel in many war plants and in homes.

■ ■

Gas Holder Scrapped

One of New York City's first large gas holders is going to do its part in the war. Consolidated Edison Co. of New York, Inc., announced that a gas holder at East 12th St., Manhattan, was to be dismantled and nearly 5,000,000 lb. of iron and steel made available for the war effort. This is almost the quantity of scrap necessary in building the hull of a heavy cruiser.

Title to the holder has just been transferred to War Materials, Inc., and demolition will start soon. The company has adjusted its gas operations so that the storage requirements at this location can be handled efficiently by two other gas holders.

The holder which will become scrap is of 4,000,000 cu. ft. capacity, and is of the telescopic type. In 1895, when it was built, a holder of that size was considered large, whereas now Consolidated Edison has several holders of 15,000,000 cu. ft. capacity.

The guide frame of the holder stands 200 ft. above the ground.

ASSOCIATIONS

NATURAL GAS MANAGEMENT CONFERENCE

Materials and Manpower Shortages Are Major Problems Facing Industry Leaders

AMERICA'S Natural Gas Industry—Dedicated to Victory!

With this as their watchword, 500 leaders of the gas utility industry during the week of April 26 met in somber conference at Cincinnati with but one objective—victory! Many of the men there assembled held deep in their hearts a prayer and strong in their minds the will to win this victory, soon and completely, with every power at their command, for they have the greatest incentive of all to achieve—their young men are now or soon will be carrying the fight to the enemy. These young men, they must not fail.

The Natural Gas Management Conference was held on Wednesday, April 28, at the Gibson Hotel and the meeting was called to order promptly by Chairman Burt R. Bay, president of the Northern Natural Gas Co., of Omaha, Neb.

Opening remarks at this meeting were presented by A. F. Bridge, president of the American Gas Association and vice president and general manager of the Southern Counties Gas Co., Los Angeles, and by Major Alexander Forward, managing director of AGA.

Mr. Bridge voiced the feeling echoed by others at the subsequent meetings —that although the Allies will win, the thought of victory soon was merely wishful thinking. The gas industry must fight as does the soldiers on the battlefield — until the unconditional surrender of the enemy.

Speaking of the future, President Bridge said that the gas industry was in the business of supplying and satisfying fundamental human needs, and that if it continues to supply efficiently the best possible service for these needs it will safely weather the post-war storms. However, the transition from war to peace will involve many problems in continuing the promotion of prosperity and the prevention of unemployment. Urging a study of the broader problems the nation must face, Mr. Bridge said:

> There are a number of favorable factors which should promote prosperity and prevent unemployment. Among these the first is the current reduction of private debt and the accumulation of unexpendible savings, which together represent a vast reservoir of dammed-up purchasing power. Second is the deferred demand for goods of all kinds which, already enormous, will continue to grow rapidly as the war continues, and things that are now irreplaceable wear out or are consumed. It has been estimated that this deferred demand will aggregate 23 billions of dollars by the end of this year. This is the bright side of the picture which we prefer to view, but there are also less pleasant but equally real aspects of the future situation which we should not overlook.
>
> The war is going to cost us a colossal sum of money—perhaps more than all the wars have cost all the people in the history of the world. Even if it ended tomorrow, the figure would be many times our aggregate cost for all the wars in our national history. No one, I think, can undertake to predict what strains this stupendous debt will place on our economy. It is going to take the most careful thinking and planning to avert calamity, and it's going to mean a tremendous responsibility for those who are in executive capacities in major industries.

Following the opening remarks, Chairman Bay presented his report covering some of the problems of the natural gas industry under war conditions. Excerpts from Mr. Bay's report are published on page 23.

The delegates were next privileged to hear from the directors of the two Washington agencies responsible for coordinating the gas industry with the war effort—E. Holley Poe, director, Natural Gas and Natural Gasoline Division, PAW, and J. A. Krug, director, Office of War Utilities, WPB.

Mr. Poe discussed briefly the recently issued PAO-11 which simplifies and clarifies administrative procedure in regard to petroleum and natural gas production. (*GAS*, April, 1943, p. 49.) He commended the industry on its ingenuity in conserving critical materials, stating that one-third of the line laid during the past year had been done with reclaimed pipe.

The problem of manpower shortage looms as most important for the near future. Mr. Poe urged that all companies file the necessary forms for the deferment of essential workers. He stated that PAW would soon issue advice and aids to help the industry solve manpower problems, but emphasized that such problems are regional and local and could not be directed from Washington.

Pointing out that the road ahead is long, hard and rocky, Mr. Krug outlined briefly some of the problems with respect to critical material shortages which the industry must face in the near future. He stated that during the third quarter one-third of all the demands for critical materials from the various claimant agencies must be denied. This could only mean that the gas industry would receive but little of the 750,000 tons of steel asked for utility operations.

To cope with the problem of material shortage, Mr. Krug asked that the executives redouble their efforts to solve material shortage problems by making deals among themselves, by exchanging facilities and inventories, by any method, even at a sacrifice, that would further the industry's service to the war program. The Office of War Utilities is now formulating a comprehensive plan to adjust the inventories of all utilities.

Several pipeline projects have been approved as essential in furthering the war program. The first of these, to serve the Appalachian area, is the looping of the Panhandle Eastern line from Liberal, Kan., to Zionsville, Ind. This project consists of 86 miles of 26-in. line and will involve installation of 6000 additional compressor horsepower. Another section of this looping project will be the construction of 35 miles of 26-in. line.

One of the projects currently under construction to relieve the gas shortage in the eastern Pennsylvania, New York, Cleveland and Toledo areas is the building of 120 miles of 20-in. line for the East Ohio Gas Co. Another project approved was 25 miles of 24-in. line for Northern Natural Gas Co. Approval is also being sought for a line from the

CINCINNAT

GAS Camera Catches Leade
At the Management Sessio

Kurwin R. Boyes, secretary, American Gas Association, took charge of the registration of delegates at one of the important gas industry meetings held in Cincinnati during the week of April 26-30.

Photographs by

GAS

Staff Photographer

A. F. Bridge, president, American Gas Association and vice president and general manager, Southern Counties Gas Co., Los Angeles, caught in a between sessions conference with AGA Vice President **Ernest R. Acker,** president and general manager of Central Hudson Gas and Electric Co. at Poughkeepsie, N. Y.

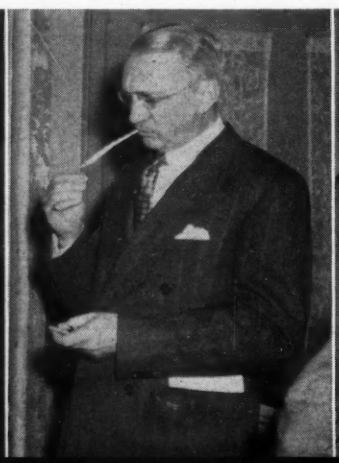
J. A. Krug, director, Office of War Utilities, WPB; **Martin Bennett,** chief of natural gas supply, and **Alexander Macomber,** chief of Manufactured Gas Division, both of OWU. Mr. Krug outlined OWU policy at Natural Gas Management Sessions.

Natural Gas Section Chairman **Burt R. Bay,** president, Northern Natural Gas Co., Omaha, Neb., prepares to open the sessions. **R. E. Wertz,** Natural Gas Section vice chairman and president, Amarillo (Texas) Gas Co., stands by to help.

Three East Ohio (Cleveland) Gas Co. executives: **W. G. Hagan,** vice president and general manager; **J. French Robinson,** president; and **W. G. Rogers,** vice president (back to camera), talk matters over with **J. J. Jacobs, Jr.,** vice president, Peoples Natural Gas Co., Pittsburgh, Pa.

Frank C. Smith, president, Houston Natural Gas Co. in Texas, takes time out for a cigarette between meetings.

Lyle Harvey, president, Bryant Heater Co., Cleveland; **B. H. Gardner,** vice president, Columbia Engineering Corp., Columbus, Ohio; **Fred Armbruster,** supervisor, gas utlities, Middle West Service Co., Chicago; **H. Carl Wolf,** chairman, AGA National Advertising Committee.

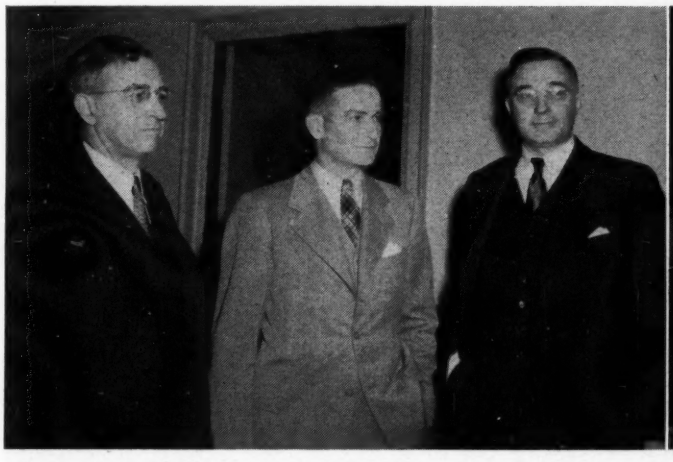


T CONFERENCE

den f the Natural Gas Industry
sio eld at Hotel Gibson, April 28

Going around the circle: **S. R. Inch** (back to camera), Ebasco Services, Inc.; **Gene Milener,** AGA Industrial and Commercial Gas Section sercetary; **E. P. Noppel,** operating sponsor, Ebasco Services, Inc.; **Everett J. Boothby,** vice president and general manager, Washington (D. C.) Gas Light Co.; and **A. W. Lundstrom,** Ebasco gas operating consultant.

J. A. Brown, gas engineer, Commonwealth & Southern Corp., New York City, and **Walter C. Beckjord,** vice president and general manager, Columbia Gas & Electric Co., New York City, get together before the natural gas sessions begin. Mr. Beckjord served as president of the American Gas Association in 1940.



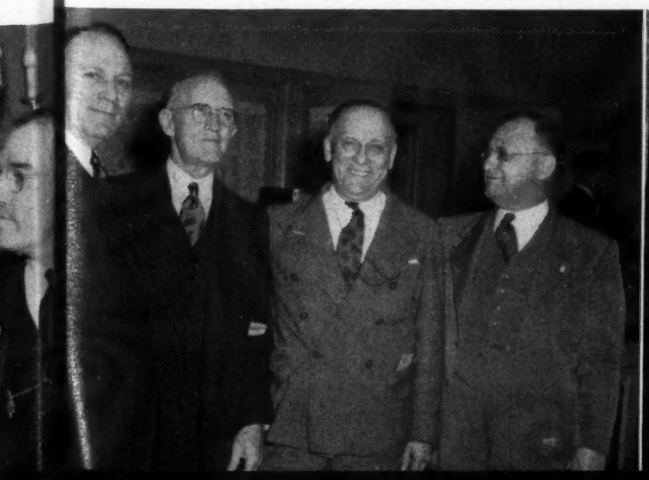
L. E. Knowlton, general superintendent, Providence (R. I.) Gas Co.; **A. C. Cherry,** superintendent, gas distribution, Cincinnati Gas & Electric Co.; **F. A. Lydecker,** superintendent, gas distibution, Public Service Electric & Gas Co., Newark, N. J.

George S. Jones, vice president in charge of sales for Servel, holds a cocktail hour conference at the Gibson Hotel's Keyhole Bar wih **W. M. Jacobs,** general superintendent of sales for the Southern California Gas Co., Los Angeles, Calif.

Fred Armbruster, supervisor, gas utilities, Middle West Service Co., Chicago; **S. E. Linton,** president, Nashville (Tenn.) Gas & Heating Co.; **W. E. Derwent,** vice president, Geo. D. Roper Corp., Rockford, Ill.; **A. F. Davey,** vice president, Wisconsin Public Service Corp., Sheboygan.

Charles Kimball, advertising manager, Hartford Gas Co. **H. Carl Wolf,** president Atlanta Gas Light Co.

Honoria Moomaw, acting secretary, Natural Gas Section, AGA; **Gene Milener,** secretary, Industrial and Commercial Gas Secion, AGA; **E. Holley Poe,** director, Natural Gas and Natural Gasoline Division, PAW. Mr. Poe served several years as secretary of the Natural Gas Section.



Hugoton to serve the Kansas City area.

During the coming winter many new war industries will reach full operation, and it will be essential that the gas industry continue the conservation program which was used effectively last year, stated Mr. Krug, who urged that for particular jobs the best and most plentiful fuel be used regardless of competitive problems.

The morning session of the natural gas meeting was brought to a close by three reports on production, transmission and distribution given respectively by L. T. Potter, chairman, production committee, Natural Gas Section, and chief production engineer, Lone Star Gas Co., Dallas; R. H. Ulrich, chairman, transmission committee, Natural Gas Section and vice president, Southern Natural Gas Co., Birmingham, Ala.; and D. P. Hartson, vice president, Equitable Gas Co., Pittsburgh, Pa.

Afternoon Session

Vice Chairman R. E. Wertz, president of the Amarillo (Texas) Gas Co., presided at the afternoon session which brought four industry leaders as speakers covering widely divergent topics.

Ernest R. Acker, chairman of the AGA War Activities Committee, was the first speaker on the program. He discussed in general the functions of his committee, the use of heavy oil by water gas companies in District 1, the use of reclaimed solder in the repair of gas meters, critical materials study, gas conservation, and house heating conversion. (*GAS*, April, 1943, p. 24.)

Guest speaker on the program was Paul B. Coffman, vice president of Standard & Poor's Corp., New York City. Looking at the industry's development during the war and post-war periods, Mr. Coffman said:

> I have made an elaborate analysis of how investors classify the various branches of the utility industry. The investor believes the risk increases in the following order: Telephone companies, water companies, electric operating companies, manufactured and mixed gas companies, all natural gas companies and natural gas pipeline companies. Actually, the composite five-year average earnings price ratios for the companies in each of the above divisions are as follows: 5%, 5.34%, 5.51%, 6.74%, 7.77% and 9.03%. In other words, in the opinion of the investor, a natural gas pipeline company faces substantially more hazard than a telephone company, which is measured by an additional 4.03% of return demanded by the investor on his money. Moreover, he believes that natural gas pipelines are considerably more hazardous than the other main branches of the utility industry, as indicated by the above figures.
>
> The composite of investor-thinking still makes a fairly reliable barometer, and I wonder if the Federal Power Commission would not do well to recognize this fact. I do not believe it is possible for the commission to continue its present procedure of establishing the lowest possible rate base and the lowest possible rate of return and at the same time permit a company to produce a return which will be sufficient to attract capital to the natural gas industry.

A most comprehensive report entitled "Four Years Under the Natural Gas Act" was presented by Marshall Newcomb, assistant general counsel, Lone Star Gas Co., Dallas (L. T. Potter read the paper), as the third feature address of the afternoon. The act, which conferred far-reaching powers on the Federal Power Commission, was analyzed by Mr. Newcomb through discussions of all the contests between the commission and the companies since the inception of the act. Generally speaking, Mr.Newcomb broke his discussion down into the following general topics: (1) jurisdiction; (2) certificate of public convenience and necessity; (3) abandonment of facilities; (4) accounting; (5) rates; and (6) miscellaneous.

Final speaker on the afternoon session was A. M. Rippel, manager of natural gas production for Phillips Petroleum Co., Bartlesville, Okla., who presented a paper prepared by Phillips President K. S. Adams on the subject of "The Future of Natural Gas and Its Derivatives." Excerpts from Mr. Adams' paper appear on page 00.

Arrangements for the one-day Natural Gas Management meeting were competently handled by Honoria B. Moomaw, acting secretary of the Natural Gas Section.

Accountants Hold Cincinnati Meeting

MEETINGS of the electric and gas industry accountants were held at the Netherland Plaza Hotel, Cincinnati, on April 27-28. The first day was devoted to four group meetings, while a general session and luncheon meetings occupied the second conference day.

The customer activities group session was presided over by E. F. Embree, New Haven Gas Light Co., New Haven, Conn., and H. R. Flanegan, Philadelphia Electric Co., Philadelphia. Topics discussed included: "Trends in Customer Accounting," "The Case for Bi-monthly Billing," "Customer Accounting and Customer Collections," "Lengthened Work Schedules," "Wartime Personnel Problems," and "Postwar Planning."

R. E. Hull, United Gas Pipe Line Co., Shreveport, La.; H. H. Scaff, Ebasco Services, Inc., New York; and Leith V. Watkins, Panhandle Eastern Pipe Line Co., New York, were chairmen of the general accounting group. Subjects discussed at this gathering included: "Depreciation" and "Property Records."

The taxation group with R. M. Dodds, Ebasco Services, Inc., New York, and A. J. Neuman, Columbia Gas & Electric Corp., New York, presiding, dealt with such topics as: "Employer's Deduction for Retirement Annuities," "Surtax Credit for Public Utility Preferred Dividends," "Advantages and Disadvantages of Consolidated Returns," and the "Effect of Reacquired Stock on Invested Capital."

The relation of CMP and WPB orders to the gas and electric industry was reviewed when the purchasing, stores and transportation group convened. J. K. Brown, Michigan Consolidated Gas Co., Detroit, and W. P. McArdle, Ebasco Services, Inc., New York, were in charge of this group.

During the second day of the conference the general morning session was presided over by F. B. Flahive, Columbia Gas & Electric System, New York, and L. A. Mayo, The Connecticut Light & Power Co., Hartford, Conn.

The slate of speakers included: H. C. Blackwell, president, The Cincinnati Gas & Electric Co., Cincinnati; Robert C. Goodwin, regional director, War Manpower Commission ; C. E. Kohlhepp, chief of the inventory control branch, Office of War Utilities, WPB; W. A. Doughterty, Standard Oil Co. of New Jersey, New York; and A. F. Bridge, president, American Gas Association.

■ ■

Servicing Methods Topic of NEGA Meeting

Current appliance and servicing problems were outlined and remedies offered when members of the New England Gas Association held their ninth appliance servicing conference in Boston on April 27.

A symposium, "Important Water Heater Servicing Problems," was presented by Everett G. McCurda, C. H. Ackerman Co., and Arthur B. Cole, Cole & Sampson Co.

"Getting Along Without Repair Parts" was the topic chosen by J. R. Beccia, The Connecticut Light & Power Co., and Charles J. Allen, director of public relations, The Connecticut Light & Power Co., spoke on "Joe Service—Our Good Will Ambassador." The final morning speaker was Leo A. Peachey, Boston Consolidated Gas Co., who discussed "Some Miscellaneous Servicing Problems."

A question and answer session was held during the afternoon and was chairmaned by William H. Hanson of Providence, first vice chairman of the servicing conference committee.

Service, Maintenance, and Manpower Problems Feature AGA Distribution Meeting

WHEN H. C. Blackwell, president of the Cincinnati Gas & Electric Co., introduced Cincinnati's Mayor James G. Stewart as the opening speaker on the program of the Twentieth Annual Distribution Conference at the Netherland Plaza Hotel on April 29, he insured that the sessions would be off to a rousing start. With his scholastically humorous tales of Cincinnati the mayor had the 205 registered delegates on the edges of their chairs, and Distribution Chairman H. B. Andersen of Philadelphia kept them there during the more serious discussions on Cathodic Protection Interference and Women in Distribution Work which consumed the Thursday morning sessions.

Speaking before the opening session of the Distribution meeting, AGA President Bridge suggested that an investigation be made into the need for setting aside funds for deferred maintenance when manpower and materials would again be available. The plan would be to provide money which, because of the war, could not now be spent on maintenance. Such monies would not be considered as income and might be deductible from a tax standpoint. Advantages would be rate stabilization, assured employment following the war, an opportunity to bring service to highest efficiency in a minimum of time. Mr. Bridge in making his recommendation stated that the railroads had already had such a plan approved by the Interstate Commerce Commission.

First speaker on the morning program was A. V. Smith, consulting engineer, Philadelphia, who rendered a paper on "Cathodic Protection Interference." In the installation of cathodic protection care must be taken to protect the adjacent systems of other utilities, and Mr. Smith's study was an outline of the problems and methods that might be employed to attain this end.

As a conclusion to his remarks, Mr. Smith stated that the answer to the problem was cooperation among the various utilities in designing and testing protection for underground structures so as to eliminate interference. Mr. Smith's paper evoked much discussion. Primary contributors were Raymond S. Hadley of Susquehanna Pipe Line Co. and C. J. Kuhn of New Orleans.

Women in distribution work was the topic chosen by Frank S. Williams of Ohio Fuel Gas Co., Columbus. Mr. Williams stated that the ratio of male to female workers in his company in 1940 was 74 to 26, in 1943, 66 to 34. The general tone of Mr. Williams' paper indicated satisfaction with women workers in the distribution operations. He stated that women were about 75% as efficient as men, but that they improved with experience. After about four to six weeks training uniformed service women in specially equipped coupes (and armed with tear gas) were capable of handling high bill complaints, of making range and water heater repairs, of taking care of turn-offs and turn-ons, and other non-heavy duties of a routine and repetitive nature. It was Mr. Williams' contention that the use of women in this type of work might well be continued following the war.

A question from Chairman Andersen as to how many distribution executives were using women in such work produced a dozen affirmative answers.

The Friday meeting of the Distribution men opened with a panel discussion of emergency problems—servicing under present conditions, led by L. M. Harris; personnel, led by C. F. Turner; substitute materials, led by T. H. Kendall. All of these subjects, being of great current interest, brought many comments from the floor.

Snapped at a dinner meeting during the Distribution conference: D. P. Hartson, past chairman, Technical Section, Pittsburgh, Pa.; Gladys Henshaw, AGA Headquarters, New York; H. B. Andersen, chairman, Distribution Committee, Philadelphia, Pa.; H. L. Gaidry, chairman, Technical Section, New Orleans, La.; A. C. Cherry, vice chairman, Distribution Committee, Cincinnati, Ohio; J. D. von Maur, Toronto, Ontario, Canada.—Photo—courtesy A. Gordon King, secretary, Technical Section, AGA.

▲

Caught in Conference at the Distribution meeting: Distribution Chairman H. B. Andersen, engineer of distribution, Philadelphia Gas Works Co.; H. C. Blackwell, president, Cincinnati Gas and Electric Co.; Distribution Vice-Chairman A. C. Cherry, superintendent gas distribution, Cincinnati Gas and Electric Co. Photo —courtesy, A. Gordon King, secretary, Technical Section, AGA.

▼

First featured speaker at this general meeting was J. D. von Maur, The Consumers' Gas Co., Toronto, Canada. Mr. von Maur outlined the procedures of the Public Utilities Coordinating Committee of Toronto in working the city engineers as follows:

> The work of making the actual surveys of surface conditions is done by the city. The maps, showing the street dimensions, etc., are then sent to each utility, in turn, and the locations of its underground structures are added. After each utility has added its respective structures, the final map is completed under the direction of the city's assistant engineer, who acts as chairman of the committee. These maps show all essential dimensions and always cover at least one intersection.
>
> The cost of this work is divided equally among the four utilities and the city and is limited to an annual cost of approximately $2500 per utility. The cost of the maps to members is 30¢ per sheet.
>
> Each utility colors its particular structures in accordance with the committee's adopted plan. The sheets are placed in large binders, together with key sheets.
>
> All questions which in any way affect street work are discussed by the committee at its regular monthly meetings and, in the past 10 years, there has not been a single question which has not been satisfactorily decided.

The most dramatic event on the Distribution Conference program was the first showing of the color motion picture, "The Story of Big Inch"—the world's largest pipeline for oil. The picture was introduced by Maj. A. N. Horne, vice president and assistant general manager, War Emergency Pipelines, Inc., Cincinnati, Ohio. Photography, which was excellent, was by George B. McComb, manager, The Barrett Division of Allied Chemical & Dye Corp., New York City.

The subject of "Teaching Customers to Do Things for Themselves," presented by D. S. Bittinger of Washington Gas Light Co., is covered more fully on page 25.

Covering the operation of motor vehicles to conserve gasoline and tires, F. Heinlein of Cincinnati Gas & Electric Co. made the following statement:

> It has been our experience that there are many advantages in the use of lighter equipment over heavy equipment, such as ease of handling, saving of time, lower operating costs, and also lower transportation charges, to the operating departments. The large 1½-ton meter truck having a capacity of 46 meters has been replaced with a ¾-ton meter truck equipped with a sliding tray, the compartments of which have a capacity of 15 meters and the sliding tray 17 meters, making a total of 32 meters for this type of unit.
>
> We have also found it beneficial to interchange with other group companies a list of all idle automotive equipment, as one group may have idle equipment of some type that would be desirable in another group.

In order that small groups interested in particular problems might get together in off-the-record discussions, AGA Technical Section Secretary A. Gordon King scheduled a series of four round-table luncheon conferences. These conferences, which continued throughout the afternoons of the two-day meeting, were on the subjects of Pipe Coatings and Corrosion, led by R. F. Hadley of Susquehanna Pipe Line Co., Philadelphia; Work on Customers' Premises, led by W. T. Collins, Ohio Fuel Gas Co., Columbus; Meters and Metering, led by J. H. Collins, New Orleans Public Service, Inc.; and Construction and Maintenance, led by T. H. Kendall, Equitable Gas Co., Pittsburgh.

Whitlaw Confirmed as AGAEM Director

AT A meeting of the Association of Gas Appliance and Equipment Manufacturers in Cincinnati, April 28, H. Leigh Whitelaw was unanimously selected as the new managing director. The appointment of Mr. Whitelaw is part of the AGAEM reorganization program to afford better service to members during the wartime and in the post-war period. (See *GAS*, April, 1943, p. 47.)

Mr. Whitelaw has spent most of his business life in lines allied with the gas industry. Through the years he has been connected with such companies as the American Radiator Co., the American Gas Products Corp. and Jones & Laughlin Steel Corp. It is from his position as specialist in gas transmission and distribution with Jones & Laughlin that he joins the AGAEM. Mr. Whitelaw has been active in the American Gas Association, having been a member of several committees and serving as sectional vice president and chairman of the manufacturers' section in 1927-28 and 1928-29.

A further step in the AGAEM reorganization set-up is the appointment of Leonard Macomber as the association's Washington representative to replace A. F. Cassidy, who is entering the armed forces. New offices have been established in room 527, Munsey Building, with the same telephone number as heretofore, EXecutive 0517. Mr. Macomber has had a wide engineering experience in many parts of the world and was most recently affiliated with the Power Branch of WPB and the Maritime Commission.

Leonard Macomber

Geo. H. Richards

The third new officer approved at the Cincinnati meeting is George H. Richards, who has been appointed to represent the group in connection with any legal matters. He has had a wide experience in corporate legal practice, having been a member of the New York State bar since 1907.

AGAEM President Colonel Willard Rockwell, in addressing the meeting, stressed closer ties with the American Gas Association and its plans for the post-war era.

Treasurer John Van Norden commented on the budget which had previously been mailed to all members.

Mr. Macomber announced that here-

after a bulletin covering Washington developments and trends will be mailed to all members.

The reorganization committee included Lyle C. Harvey, John A. Fry and John Van Norden, all of whom were appointed at an association meeting on Feb. 6.

■ ■

Maryland Utilities Group Holds Spring Conference

THE spring conference of the Maryland Utilities Association was held Friday, April 30, at the Belvedere Hotel, Baltimore. This was a combined meeting of the transportation, gas and electric groups of the association. The meeting was opened at 1:15 p. m. with remarks by President Lewis Payne, who introduced C. B. Melton, chairman of the combined meeting.

Speakers on the program were: T. P. Walker, president, Council of Electric Operating Companies, Washington, D. C.; Capt. H. Cotson Minchin, British Embassy, Washington, D. C.; E. J. Boothby, vice president and general manager, Washington Gas Light Co., Washington, D. C.; Brig. Gen. William C. Rose, War Manpower Board, Washington, D. C.; William E. Mitchell, vice president and general manager, Georgia Power Co., Atlanta, Ga.

Officers re-elected for the 1943-44 term of office were: President, Lewis Payne, Eastern Shore Public Service Co., Salisbury, Md.; vice president, C. B. Melton, Hagerstown Gas Co., Hagerstown, Md.; treasurer, D. C. Turnbull, Jr., Consolidated Gas, Electric Light & Power Co., Baltimore; and secretary, J. L. Landon, Jr., Eastern Shore Public Service Co., Salisbury, Md.

Directors re-elected for the 1943-44 term of office were: R. C. Brehaut, Washington Suburban Gas Co., Hyattsville, Md.; H. G. Haydon, Potomac Electric Power Co., Washington, D. C.; J. A. Stoll, Baltimore Transit Co., Baltimore, Md.; R. L. Smith, The Potomac Edison Co., Frederick, Md.

Directors elected to fill vacancies were: Henry E. Davis, Conowingo Power Co., Elkton, Md.; W. B. Bennett, Capitol Transit Co., Washington, D. C.

■ ■

Indiana Association Elects Guy T. Henry President

Guy T. Henry, president, Central Indiana Gas Co., Muncie, was elected president of the Indiana Gas Association when that group held its 33rd annual meeting in Indianapolis on May 13.

Attendance was considerably more than was expected at the one-day meeting which had been advertised as an "open directors' meeting." Discussions of immediate war problems occupied the greater part of the day and a keynote address was given by retiring President C. V. Sorenson of the Northern Indiana Public Service Co., Hammond. Other speakers included V. C. Seiter, chairman of the accounting committee; Guy Johnson, chairman of the research committee; Herman G. Horstman, chairman of the technical committee; and George O. Stewart, chairman of the sales committee.

Besides President Guy Henry, other officers elected at the meeting include: Clarence W. Goris, vice president, Northern Indiana Public Service Co., Gary, vice president; Paul A. McLeod, division manager, Public Service Co. of Indiana, Inc., Newcastle, secretary-treasurer; A. E. Hatley, Central Indiana Gas Co., Marion; R. A. Gallagher, Public Service Co. of Indiana, Inc.; Dean T. Burns, Citizens Gas & Coke Utility, Ind., and H. G. Horstman, Public Service Co. of Indiana, all directors.

■ ■

AMERICAN GAS ASSOCIATION AWARDS

Meritorious Service Medal

SUPPORTED by an endowment in memory of Walter R. Addicks, then retired senior vice president of the Consolidated Gas Co. of New York, the American Gas Association Meritorious Service Medal is bestowed with discrimination, making it an award to be greatly coveted.

Consisting of a beautiful gold medal, button, and certificate, this award by the Executive Board is the gas industry's official recognition of the gas company employee who has performed the most meritorious deed during the year. It is awarded for meritorious and conspicuous judgment, intelligence or bravery, either in the plant or work of any gas undertaking, or having to do with the handling of the materials of manufacture or of the production, manufacture or distribution.

It is available to an employee of any manufactured gas company or natural gas company or manufacturer company member of the Association. War conditions make it particularly suitable this year and will be especially considered by the Award Committee.

To qualify, the deed must have been performed during the period beginning July 1, 1942 and ending June 30, 1943. Applications for the 1943 Award should be sent to Association Headquarters on or before August 1, 1943. Forms for the application will be furnished up request.

■ ■

Charles A. Munroe Award

In the belief that recognition of service to an industry is especially appropriate in wartime, the Charles A. Munroe Award of the American Gas Association is offered again this year. The award consists of a substantial sum of money and a permanent certificate and is made annually by the Executive Board to the individual adjudged to have made the outstanding contribution to the industry.

An accomplishment on any phase of the gas business may be considered. For instance, since the first award in 1929, it has been given for developments in refrigeration; labor saving accounting; rate making; dealer cooperation; sales expansion; public relations; research; change-over from one to another kind of gas; promotion on the national advertising program; scientific developments in connection with gas measurement, etc.

Applications must be received at AGA headquarters by Aug. 1.

James Vaiden Elected New President of NGAA

James W. Vaiden of the Skelly Oil Co., Tulsa, Okla., is the new president of the Natural Gasoline Association of America, elected at the 22nd annual convention in Dallas, Texas, April 14-16, a meeting which had for its principal theme discussions of war products and processes. Mr. Vaiden was vice president last year and succeeds Ray E. Miller of Hanlon-Buchanan, Inc.

The vice presidents for the ensuing term are H. H. Beeson, Sabina Valley Gasoline Co., Inc., Shreveport, La.; H. A. Ells, Cities Service Oil Co., Bartlesville, Okla., and R. A. Carter, Continental Oil Co., Ponca City, Okla. C. R. Williams, The Chicago Corp., Corpus Christi, Texas, will be the new vice president of the High Pressure Gas Division this year. William F. Lowe will again serve as secretary-treasurer. Thirteen member companies were elected to serve a two-year term as directors with 13 other companies which hold over from last year's election.

The Hanlon Award, top prize of the natural gasoline industry for meritorious accomplishment among its members and for a number of years a feature of the annual NGAA conventions, was presented to Franklin P. Peterson, declared to be the "father of the liquefied petroleum gas branch of the natural gasoline industry."

■ ■

Wisconsin Utility War Conference on May 24

All four sections of the Wisconsin Utilities Association participated in the one-day war conference was held at the Pfister Hotel, Milwaukee, on May 24.

Section chairmen for the meeting included: Dudley Montgomery, transportation; H. P. Taylor, accounting; E. C. Hemes, technical division, gas section; Albert Smith, commercial division, gas section; J. A. Tyvand, technical division, electric section; and Paul De Leon, commercial division, electric section. Sections held their individual round-table conference from 10 a. m. until 12:30 p. m. Joint sessions began with a luncheon and continued during the afternoon. The newly elected association officers were formally initiated at the dinner meeting.

■ ■

SCMA Hears Randal Maass Discuss Cycling Processes

"Some Aspects of Cycling Processes" was the subject of an address by Randal Maass of the General Petroleum Corp. when he was featured speaker at the regular monthly meeting of the Southern California Meter Association held at Downey, Calif., on May 20. Mr. Maass presented reasons why cycling processes are desirable, and why they are designed as they are.

The May meeting was set aside as "Past Presidents Night" in appreciation of the efforts and cooperation of the past presidents in promoting the association.

■ ■

Foreman's Association Holds Dinner Meeting

The Foreman's Association of the Pittsburgh Equitable Meter Co., Pittsburgh, Pa., recently sponsored a dinner at the Hotel Webster Hall for company officers, department heads and other invited guests.

Carl Dixon, plant superintendent, acted as master of ceremonies and short talks were given by Col. Rockwell, president, and other members of the supervisory force. Entertainment and dancing were enjoyed during the evening.

■ ■

AGA Proceedings Published

The proceedings of the twenty-fourth annual meeting of the American Gas Association held on Oct. 5-6, 1942, in Chicago have now been published in book form by the association. The book is available from the AGA headquarters at 420 Lexington Ave., New York City.

Members of the AGA Committee on the operation of public utility motor vehicles: (seated): E. W. Jahn, committee vice chairman, Baltimore, Md.; Linn Edsall, committee chairman, Philadelphia, Pa. (Standing): B. D. Connor, Boston, Mass.; S. G. Page, Pittsburgh, Pa.; Jean Y. Ray, Richmond, Va.; Alan A. Cullman, New York City.

Motor Vehicle Conference Held in New York City

Members of the technical section of the American Gas Association attended the conference on the operation of public utility motor vehicles at the Hotel Pennsylvania, New York City, on May 4. Linn Edsall was chairman of the conference. (See photo.)

Greetings were extended to the gathering by John W. West, Jr., assistant managing director, AGA, and the first address of the conference was provided by Frank R. Archibald, National Carbon Co., New York, who spoke on "Standard Practice Instructions." D. K. Wilson, New York Power & Light Corp., was the other morning speaker and he had chosen "Problems in Front End Alignment" as the topic of his paper.

The major portion of the afternoon meeting was devoted to panel discussions of various subjects related to the operation of public utility motor vehicles. Lee A. Brown, head, tire inspection section, OPA, Washington, D. C., explained the "Practical Application of OPA Instructions to Tire Inspectors."

■ ■

New England Gas Sales Managers Meet

When the sales managers' conference of the New England Gas Association was held on May 20 at Boston, home service members and appliance manufacturers representatives also attended.

Douglas E. Lenfesty, advertising and sales promotion manager, Wetmore-Savage Division, Westinghouse Electric Supply Co., Boston, and William R. Cole, extension specialist in food preservation, Massachusetts State College, addressed the morning session. Mr. Lenfesty spoke on "No Merchandise — But Outstanding Displays," and presented his impression of various gas company window displays. A demonstration of displays was shown.

Mr. Cole dealt with the various methods of food preservation and expressed the need for this work in wartime.

"Post-war Planning Within the Company" was the topic chosen by W. C. Richardson, Jr., New England field representative, committee for economic development, who was the first afternoon speaker. "Gas Industry Post-war Planning" was discussed by R. J. Rutherford, chairman, subcommittee on factors affecting the realization of the potential markets, AGA post-war planning committee.

A special home service group met during the afternoon to discuss the latest nutrition and food developments.

■ ■

T. E. Rooke to Head Mid-West Gas Group

WHEN the Mid-West Gas Association held its 38th annual meeting at Omaha, Neb., on April 12, T. E. Rooke of the Geo. D. Roper Corp. was elected president.

Other officers elected for the year 1943-44 include: C. A. Bland, Iowa Power & Light Co., first vice president; B. R. Bay, Northern Natural Gas Co., second vice president; and R. B. Searing, Sioux City Gas & Electric Co., secretary-treasurer.

Executive Council

1941-1944

J. M. McIntire.....Casper, Wyo.
E. C. Deane.....Sioux Falls, S. D.
Elmer Cone.....Kansas City, Mo.
E. A. Brown.....Omaha, Neb.

1942-1945

T. G. Kus.....Omaha, Neb.
J. C. Clarke.....Fargo, N. D.
Thomas L. Connor.....Mason City, Iowa
John J. Burnett.....Chicago, Ill.

1943-1946

George Beattie.....Des Moines, Iowa
Walter Byrne.....Omaha, Neb.
Geo. G. Holmes.....Davenport, Iowa
D. R. Putnam.....St. Paul, Minn.

Affiliation Representatives

Manufacturers' Section: K. R. D. Wolfe, Fisher Governor Co., Marshalltown, Iowa.

Technical Section: Lester J. Eck, Minneapolis Gas Light Co., Minneapolis, Minn.

Accounting Section: E. H. Vieregg, Northwestern Public Service Co., Grand Island, Neb.

Residential Section: E. J. Boyer, Minneapolis Gas Light Co., Minneapolis, Minn.

Industrial and Commercial Section: E. E. Hahn, Iowa-Illinois Gas & Electric Co., Cedar Rapids, Iowa.

NEGA Operating Division Meets to Discuss Problems

THE operating division of the New England Gas Association held a one-day meeting at the University Club, Boston, on April 21, to discuss current operating problems.

F. A. Williamson, supervisor, public utilities department, New England Fire Insurance Rating Association, was the principal speaker at the morning session when he spoke on "The Effect on Insurance Coverage of Using a Class 1 Fluid as the Enricher in Manufacturing Water Gas." Mr. Williamson outlined the use of low octane gasoline as an enricher from the standpoint of handling and storage.

During the remainder of the morning session a symposium on the subject, "The Cleveland Flow Control Under Last Winter's Peak Load Conditions," was conducted by R. S. Carter of Malden, Harry Eisenberg of Worcester, A. B. Hamilton of Hartford, and C. L. MacLauchlin of New Bedford.

"The New Regional Utility Inventory Control Office" was the topic of a luncheon meeting symposium covered by R. J. Daniels, general storekeeper, New England Power Association properties, and Ralph E. Walters, regional utility engineer, regional utility inventory control office, Office of War Utilities, WPB. The speakers covered the history, background, purpose, scope and methods of operations of the new Boston regional office recently established to expedite procedures in securing repair and maintenance equipment.

During the afternoon two discussion sessions were planned. The production group was presided over by Walter C. Slade, chairman, and George W. Culver, vice chairman, while E. S. Umstead and William Laverty had charge of the discussions in the distribution meeting.

■ ■

CNGA Will Hold June Frolic At Rio Hondo June 5

The California Natural Gasoline Association will hold its annual June frolic on Saturday, June 5, at Rio Hondo Golf Club, 607 Old River School Road, Downey, Calif., according to the joint announcement of William W. Robinson, Jr., association president, and Ben C. Dumm, chairman of the entertainment committee. George Tyler is secretary of the association.

Assisting Mr. Dumm are his committeemen, including H. A. Dresser, The Fluor Corp., Ltd.; Lloyd Jones, The Cooper-Bessemer Co.; Ray Todd, Pacific Lighting Corp., and L. P. Sacre, Allied Supply Co.

The 1943 frolic has been specially planned to consider the fact that many CNGA members are working a 48-hour week and accordingly the big time of the event will start with the buffet dinner at 6 o'clock in the evening and continue through the 17-act show, while a full sports program, carded for both the morning and afternoon, has been arranged.

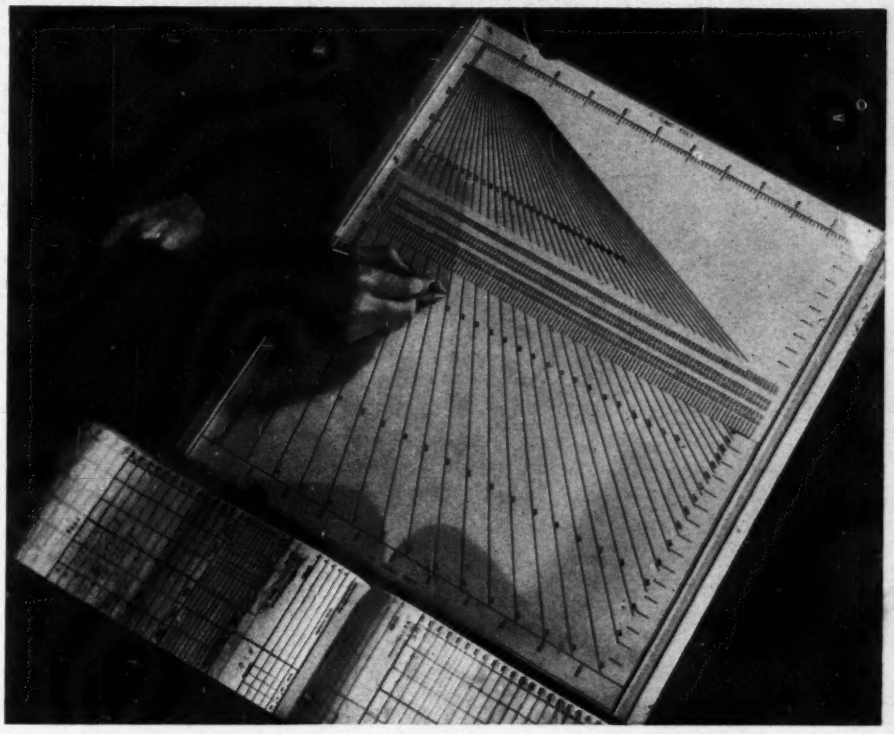
■ ■

John Felton New President Of Wisconsin Utilities

John G. Felton was elected president of the Wisconsin Utilities Association by vote of the membership in April. S. B. Sherman was elected vice president, while D. W. Faber was re-elected treasurer.

The new president is a director of the Northern States Power Co., and the new vice president is vice president and general manager of the Wisconsin Gas & Electric Co. Mr. Faber is secretary and assistant treasurer of the Wisconsin Public Service Corp.

E. R. Felber, retiring president, succeeds L. F. Seybold as chairman of the advisory committee.



A close-up of the chart by which space-heating bills can be estimated quickly and accurately.

Bi-Monthly Billing of Heating Customers

By C. G. ALDER

Consumers Power Co., Jackson, Michigan

WHEN we were faced with the problem of estimating a gas consumption every second month for some 10,300 space-heating customers in the Lansing and Hastings Divisions, we were rather concerned about a method which would be as accurate as possible for a group of estimators to apply.

Many years' experience has taught us that if people live rather consistently in their homes, month after month, their gas consumptions and, consequently, their heating bills will be almost exactly in proportion to the outside temperature, a factor over which no mortal has any control.

Some 18 or so years ago, Eugene Milener, of the American Gas Association, proposed and introduced a yardstick to measure and explain why John Doe's space-heating bill was perhaps twice as much in November as it had been in October.

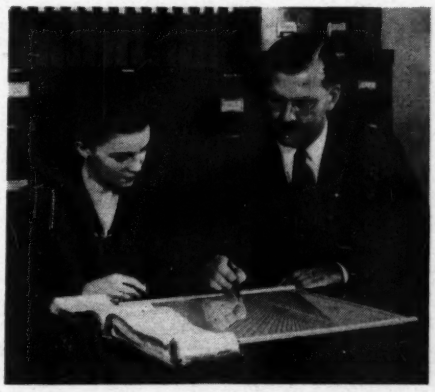
In those days gas-heating customers were sold on yearly estimated costs for gas, based on a temperature of 70° for 16 hours of the day and 55° for eight hours at night, which is an average temperature in their homes of 65° for the 24 hours.

The proposed yardstick was called a "degree-day." By definition, the number of degree days per day is the difference between this average inside temperature of 65° and the day's mean outside temperature when the latter is less than 65°. This unit has since been adopted by all architects and heating engineers in designing heating plants, and is in constant use in all branches of the space-heating industry.

To get back to our subject of estimating heating bills, we first considered using published tables, showing the long-period average number of degree days for the various months, but perceived that this plan wouldn't do because our billing periods ran from the first of one month to the first of the next month for only a very small percentage of our customers, namely, those few whose gas meters are read on the first day of each month.

We then decided to mark each space heating customers' meter book sheet with a number which represents the total amount of gas used by that customer during his coldest billing period last winter, divided by the number of degree days during that period; or, in other words, this number is the amount of gas he used per degree day of cold last winter. Then, knowing the mean temperature for every day in any period being estimated, we can multiply the number of degree days in that period by the number on the customer's sheet and obtain a consumption on which to bill him for the month being estimated.

We realized that heating plants operate a little more efficiently during the coldest weather and that the customer's number thus arrived at would be slightly lower than one obtained by dividing a whole winter's consumption by that winter's total number of degree-days. This was thought to be an advantage, since our customers would be least inconvenienced if the most accurate part of their estimating came in the coldest months, when their bills were highest and most difficult to meet.



C. G. Alder is shown demonstrating to Charlotte Page how the chart and slider are used in estimating space-heating bills for bi-monthly billing. Mr. Alder is in charge of industrial gas sales in Lansing and Hastings divisions of Consumers Power Co., Jackson, Mich.

It was logical to go one step further and design a chart and slider to save the work of multiplying the number on the customer's sheet by the number of degree-days in the period being estimated. The slider is set for each meter book on the figure representing the number of degree-days in the estimating period and the estimator reads from the slider not only the customer's estimated consumption, but the amount of his gross and net bills as well, determined by the point where lines representing the numbers in the meter book meet the slider.

■ ■

Erection of Butadiene Plant Planned by Standard

A large, new butadiene plant, first of its kind on the Pacific Coast, is expected to be put into operation by Standard Oil Co. of California early in September, to produce the principal ingredient used in making synthetic rubber.

Announcement to this effect was made recently by H. D. Collier, president, at the company's annual stockholders' meeting in San Francisco.

NOW on the air

BILLIE BURKE, noted screen and radio comedienne, supplies the laughs in Saturday morning's newest radio program, "Fashions in Rations." In the role of the point-perplexed housewife, she puzzles over food rationing and shortages with her cook, Jefferson James. There's a chuckle in every line—and a worthwhile food lesson, too, as she comes up with many unusual and hilarious solutions.

for Gas and Gas Service

BILLIE BURKE

IN A NATIONWIDE HOME VOLUNTEER PROGRAM OF WARTIME FOOD FACTS AND FUN!

"FASHIONS IN RATIONS"

Every Saturday Morning—11:30 Eastern War Time

TODAY, millions of American homemakers have a new radio "must" on Saturday mornings. It's "Fashions in Rations"—broadcast over 68 CBS stations.

This full half-hour program—filled with wartime food facts, packed with fun and laughter—brings to women everywhere what they want to know about food today. How to stretch their ration points . . . what to do about food shortages . . . how to plan nutritious, healthful meals—all presented in a new and different way.

Gas Companies from coast to coast are taking advantage of this opportunity to build good will by tying in their activities with "Fashions in Rations." If you haven't already received your promotion materials, write to Servel, Inc., Advertising and Sales Promotion Department, Evansville, Indiana.

Sponsored by SERVEL, Inc. AND GAS COMPANIES FROM COAST TO COAST

ALICE WHITE, Servel's Home Volunteer Food Adviser, answers timely questions each week on point-budgeting, meal planning and nutrition.

OFFICIAL WASHINGTON AGENCIES present the latest food communiqués, and what's happening in rationing. Food leaders from the fields of government and industry will also be interviewed on the program.

LOCAL STATION "BREAK-INS" enable Gas Company home service consultants to talk directly to their customers about local food conditions and facts . . . invite them to their showrooms for further help and guidance in meal-planning problems.

Flash Tube Lighting Bulletin Issued

DATA covering automatic flash tube and pilot ignition of gas range oven and broiler burners operating on manufactured gases has been incorporated into a research bulletin recently submitted to members of the American Gas Association's committee on domestic gas research. The committee will review and approve the bulletin prior to its publication.

Various methods of automatic ignition of oven burners are reviewed and development of flash tube applications as well as service experiences with such systems are outlined. As an introduction to studies on flash tubes, a full discussion is given of automatic ignition systems employing constant burning pilots and automatic valves as well as a description of such systems now in common use.

While automatic top burner lighting by use of flash tubes was thoroughly covered in a previous bulletin, many questions have arisen on the ignition of oven burners using flash tubes from the top burner pilot. Successful applications of such systems present numerous complications not encountered in top burner lighting. Little scientific information has hitherto been available to indicate the importance of different variables for the assistance of those wishing to design suitable flash tube systems. This has been provided by the study now reported.

The main portion of the new bulletin is devoted to results of an intensive study of the effect of such features as shape of flash tubes, relation between their diameter and length, area and position of relief openings, tube restrictions, relationship between lighter port sizes input rating and diameter of tubes, and numerous others. One of the most striking findings is the length of flash tube which may be employed with satisfactory ignition provided adequate diameter is employed. While the maximum length of a vertical tube of .31 in. ID., permitting proper lighting, was 1 ft., this could be increased to 10 ft. with satisfactory ignition when a tube of ¾ in. ID. was employed. Use of relief openings of proper size near the top of the vertical section of flash tube, as well as presence of cones at the bottom of the tubes, was found to increase their range of satisfactory operation. Likewise, use of larger radius of curvature in the case of curved tubes was found to increase range of operation.

Employing the principles determined from this study, successful application of flash tube systems were made to contemporary ranges, including one equipped with a high broiler. These experimental systems gave more rapid and more consistent oven and broiler ignition than was obtained by using a commercial flash tube assembly of the type formerly furnished. As its service record has been quite satisfactory over a period of years, flash tube assemblies embodying the refinements and improvements resulting from the present investigation may logically be expected to bring about still further improved performance.

Studies reported in this bulletin are confined to those obtained with manufactured gases of types commonly distributed. Similar studies covering natural gas will be presented in a later publication.

■ ■

Special Ration Stamps Issued for Safety Shoes

Under the original OPA shoe rationing regulation it was necessary for the industrial employee to spend his own No. 17 coupon or any available family coupon in order to get a pair of safety shoes. If these coupons had been spent on other shoes, it was necessary for the worker to apply to his OPA district office for a special shoe ration stamp.

In order to correct this condition, the OPA has amended rationing regulations to make steel-toe safety shoes readily available to every industrial employee who needs them. Under the new regulations, industry itself is permitted to take applications for safety shoes from its employees, and to issue special safety shoe ration stamps in the plant.

■ ■

Authority of WPB Field Service Increased

In line with its policy of decentralization, the WPB has raised the dollar limit of PD-1A applications processed in the field from $100 to $500, effective May 8.

Beginning May 8, all PD-1A applications involving not more than $500 worth of material on which priority assistance is requested have been processed in either the District or Regional Offices according to the direction of the respective Regional Directors, except where specifically otherwise directed by the Director of the Distribution Bureau.

■ ■

New Coke Ovens to Help Relieve Gas Shortage

The Donner-Hanna Coke Corp., Buffalo, N. Y., sole producer of manufactured gas going into the mains of the Iroquois Gas Co., has commenced construction of a dozen new coke ovens to assist in relieving the Buffalo gas shortage next winter. According to Philip S. Savage, vice president of Donner-Hanna, the ovens will cost approximately $350,000.

The ovens, which will increase the company's gas output by about 12%, are scheduled to go into operation about Nov. 1.

HIGH CAPACITY AT LOW COST

V-300

LOW PRESSURE GAS REGULATORS

GENERAL CONTROLS V-300 gives continuous, efficient operation at low cost. This compact low pressure gas regulator is built to last... Available in correct materials for handling natural, manufactured and L. P. gases... the V-300 is furnished in sizes ranging from ⅜" to 2" I.P.S... Standard outlet pressures range from 2" to 5"; factory setting 3½" for average appliance use. Write for Catalog No. 52 with complete specifications.

GENERAL CONTROLS
801 ALLEN AVENUE • GLENDALE, CALIFORNIA
Branches: Boston • New York • Philadelphia • Cleveland
Detroit • Chicago • Dallas • Denver • San Francisco

JOHN ZINK BURNERS are ideal for REVAMPED STILLS

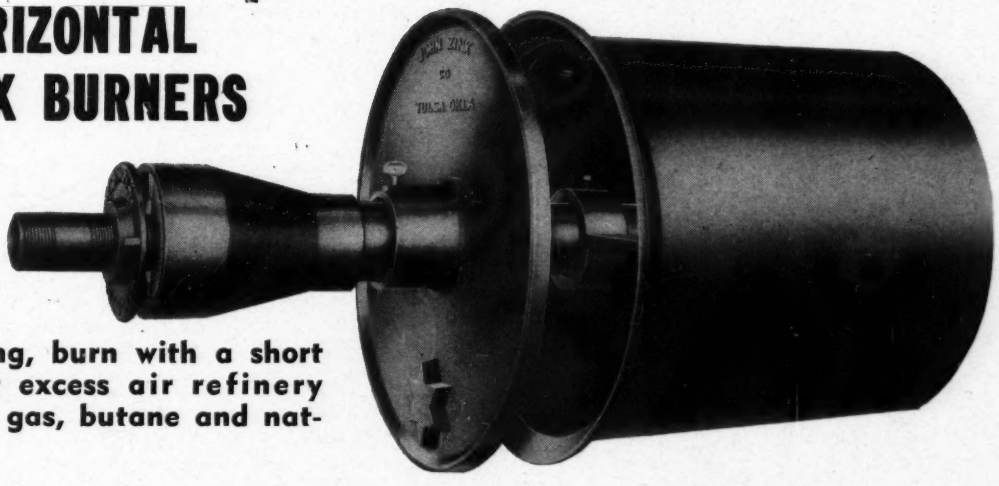
Continuous dependable burner service is of utmost importance in balanced furnaces—Nothing ever happens to Bi-Mix Burners to interfere with their satisfactory operation.

BI-MIX FLOOR BURNERS

This John Zink Bi-Mix Burner is so sturdily constructed that workmen may walk on it. It is so designed that primary and secondary air adjustments may be made without going under the burner. Because it gives "heat without flame" there is no impingement on the tubes.

The John Zink Bi-Mix Floor Burner is available with 8", 10", 12" and 14" diameter spiders.

HORIZONTAL BI-MIX BURNERS



For Wall Firing, burn with a short flame without excess air refinery gases, residue gas, butane and natural gas.

We feel sure that this John Zink Burner will fire a furnace to a higher rating than any other type of burner made, and still maintain even heat distribution.

This burner will burn anything that can come through a gas line—not damaged by slugs of water, gasoline or oil sometimes present in the fuel line.

John Zink and his engineers manufacture more than fifty types of burners; gas burners, oil burners and combination oil and gas burners for: Domestic boilers, Heating boilers, Industrial boilers and Power boilers. Special burners designed and manufactured for special purposes.

JOHN ZINK COMPANY

Tulsa, Oklahoma

NEW YORK • LOS ANGELES • DETROIT • SAN FRANCISCO

Army-Navy "E" Awards

Roper Corp.

A peacetime officer of the Geo. D. Roper Corp., who is now a wartime officer in Uncle Sam's armed forces, had the honor of presenting the Army-Navy "E" to his own company at an impressive ceremony in Rockford, Ill., on April 23. That was the role taken by Col. William L. Plummer, Roper district manager at Atlanta, Ga., and now commanding officer of Homestead (Fla.) Air Base.

Some 2000 persons, including employees, their families, county and state officials and members of the armed forces witnessed the ceremony at which Stanley H. Hobson, president of the Roper company, accepted the flag. Lieut. E. B. Bremer, USN, presented "E" lapel pins to the oldest Roper employees and representatives of families in the service. Sol W. Weill, personnel director, acted as master of ceremonies and military music was provided by the Medical Replacement Training Center band from Camp Grant.

■ ■

Worthington Corp.

"Your record of practical accomplishment is high, your production effort outstanding, and you have good reason for pride in both," wrote Hon. James Forrestal, under secretary of the navy, in informing the management and employees of the Moore Steam Turbine Division, Worthington Pump & Machinery Corp., Wellsville, N. Y., that they had been awarded the Army-Navy "E."

The presentation of the burgee was made by Lieut. Comdr. P. Tuthill, Jr., USNR, and was accepted by Vice President Maynard D. Church on behalf of the Worthington staff. Maj. John G. Doyle, USA, presented individual "E" pins to John Apsey, Gertrude Bowlby and Elmer S. Lamphier as representatives of the employees. Special addresses were given by Hon. Thomas C. Martin, mayor of Wellsville, and Hobart C. Ramsey, vice president in charge of operations for the Moore Steam Turbine Division.

■ ■

Johns-Manville

More than 4000 Johns-Manville workers and members of their families assembled in an improvised auditorium to celebrate formal raising of the Army-Navy "E" flag over their Manville, N. J., factory on March 24.

Maj. Gen. Thomas E. Robins, chief of the construction division, OCE, presented the emblem to John E. Begert, plant manager, on behalf of the Manville factory workers.

Commander Austin S. Kibbee, appearing for the navy, presented the lapel insignia, badge of honor that every employee of the plant is entitled to wear. Claude Schollenberger, president of the A. F. of L. local, and Elizabeth Mozell, representing women workers, made brief addresses.

War production at Manville includes such essential items as asbestos and asphalt building products, asbestos textiles, packings and gaskets, insulating materials, Transite pipe, brake linings and clutch facings.

Clark Bros. Co.

For their "fine record in the production of war equipment," the Army-Navy "E" Award was conferred, March 27, upon the men and women of Clark Bros. Co., Olean, N. Y.

The presentation ceremonies, held in the Olean Armory before an audience of 3500, were given unusual interest and impressiveness by the genius of John B. Kennedy, renowned radio and screen commentator, who presided.

Representing the army, Lieut. Col. Ernest W. Ogram paid tribute to the company for its quick and complete mobilization for the production of war equipment, and commended the employees for the "excellent job done to date." Speaking for the navy, Com. R. G. Walling charged all civilians with the duty of "seeing that our armed forces are supplied with the best equipment that can be made."

The "E" pennant was accepted on behalf of both management and employees by C. Paul Clark, president of the company. "E" Award pins were thereupon presented to Stephen Rice, Sr., Coletta E. Keeny, Timothy M. O'Brien and Mr. Clark, acting as representatives of the entire organization. The ceremonies concluded with an address by Mr. Rich, president of the Employees Association, who accepted the pins on behalf of the employees, with a promise that the men and women of Clark Bros. would continue in action "until the day Hitler's unconditional surrender comes."

■ ■

AGA Laboratories Issue New Approved Directory

Because manufacturing plants which in peace time supplied heating and cooking equipment to the nation are now engaged largely in war work, there are but a limited number producing gas appliances, and these are directed for the most part to government housing projects, army cantonments, etc.

In view of these conditions, the April 1 AGA Testing Laboratories' revised directory of approved gas appliances and listed accessories lists only such equipment as is being produced currently and upon which approvals have been renewed by factory inspections of production models in the usual way.

Those having stocks approved in 1942 may still use the Laboratories approval seal for the ones distributed, and former approvals which have now lapsed because of non-production may be reinstated when manufacturing starts again.

■ ■

East Ohio Orders New Liquid Gas Storage Tank

An order for a new "Toro-Segmental" liquid-natural gas storage tank has been placed by the East Ohio Gas Co. with the Gas Machinery Co., Cleveland. The tank was constructed by the Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

The inner nickel-steel shell is 70 ft. in diameter and 42 ft. 10 in. high and the outer shell is built of standard steel, being 76 ft. in diameter and 51 ft. high. Cylindrical in shape, the new storage tank is especially molded at the top and bottom to provide for expansion and contraction. It contains liquid gas equivalent to 100,000,000 cu. ft. of natural gas.

■ ■

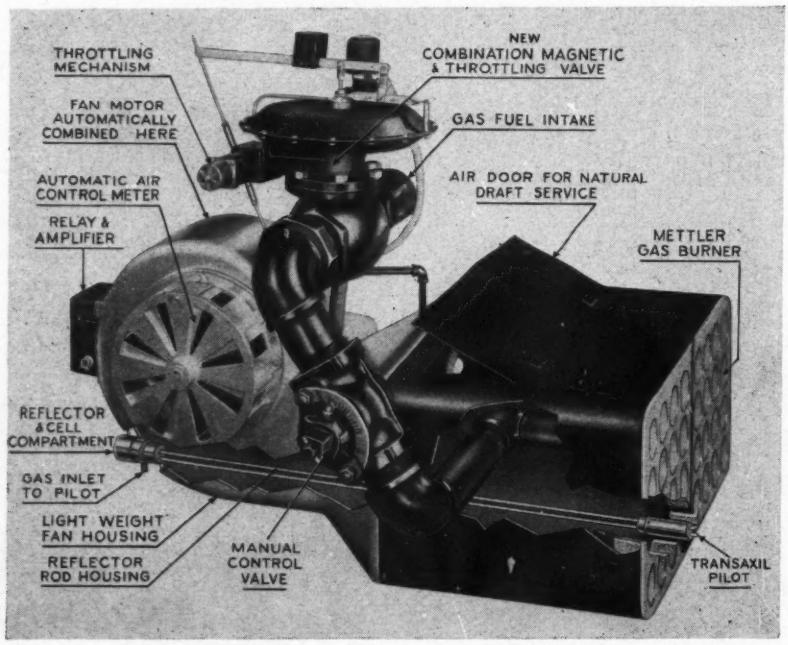
Acquires New Properties

Properties of the Kanawha Gas & Utilities system consisting of 75 producing gas wells located in Lincoln and Putnam counties, West Virginia, have been purchased by the Southeastern Gas & Water Co., Inc.

THE METTLER "FAN-AIR"

Features

A Modern Complete Gas Burner System



Makes Difficult Jobs Easier

"Transaxil" Pilot and Flame Guard in the above picture reveals the simplicity and flexibility of Mettler Mechanical Draft Gas Burners. The burners and Transaxil Safety Pilot are scientifically coordinated, *providing instant fuel shutoff upon flame failure.*

LEE B. METTLER CO.

LOS ANGELES — 406 South Main Street — CALIFORNIA

Target FOR TONIGHT

In this global war, the target of American airmen is *any spot in the world* where our Command chooses to concentrate the devastating blast of winged death—turning the enemy's favorite weapon against him with quadrupled fury. ★ Think what miracles of organization and production have made possible this swift, globe-girdling spread of American air power! ★ Every member of the PAYNE organization is proud and grateful to have a small, yet vital, part in supplying the weapons of Democracy's armed forces. ★ PAYNE facilities, greatly expanded for war production, are now dedicated to this one end. But after the war, we shall be even better equipped to resume our nearly 30 years' leadership in the peaceful science of heating.

TARGET

FOR TOMORROW

Right "on the target" of America's post-war expectations is the planning now taking place in PAYNE laboratories and drafting rooms. ★ When the day's war production problems are solved, PAYNE engineers turn to their practical dreams of the future. ★ Thus, as always, PAYNE dealers will be able to offer years-ahead design, quality and performance.

PAYNEHEAT

Payne Furnace & Supply Co., Inc., Beverly Hills, California

PEOPLE

Houston Natural Gas Co., Houston, Texas, has instituted a new department to handle specific phases of production, engineering and geological work, and has appointed **Hillard W. Carey** as production engineer in charge of the department.

Hillard W. Carey

Prior to his new appointment, Mr. Carey was for 10 years associated with the Halliburton Oil Well Cementing Co. which he joined in 1933 following his graduation from the University of Oklahoma. Mr. Carey is a member of the American Association of Petroleum Geologists, American Institute of Mining and Metallurgical Engineers, and the American Petroleum Institute.

• •

Julian Garrett, manager of Northwestern Utilities, Ltd., Edmonton, Alberta, has been elected president of the Edmonton Community Chest. He was former chairman of the budget committee of the Community Chst.

• •

Harry Wheeldon, formerly assistant superintendent of gasoline plants, Lone Star Gas Co., Dallas, Texas, has been appointed superintendent of gasoline for Lone Star Producing Co. and Lone Star Gas Co., according to an announcement by **Julian L. Foster,** Lone Star general superintendent and chief engineer. **Fred H. Townsend,** who was East Texas superintendent of gasoline plants, has been appointed assistant superintendent under Mr. Wheeldon. Mr. Wheeldon's new position was formerly occupied by the late **J. R. Jarvis.**

• •

J. H. Dunham, promotion director, Wisconsin Gas & Electric Co., Racine, Wis., has resigned to accept a naval commission. He is receiving his preliminary training at Hanover, N. H. During Mr. Dunham's absence, **Ralph Bower** will act as promotional director.

• •

F. M. Banks, vice president, Southern California Gas Co., Los Angeles, has been appointed to the War Production Board's new natural gas industry advisory committee.

• •

M. L. Lavorgna, manager of Milwaukee sales of the L. J. Mueller Furnace Co., Milwaukee, Wis., acted as vice chairman of the executive committee of the Twenty-first Annual Milwaukee Home Show held during the week of March 13 to March 21. Mr. Lavorgna was appointed chairman of the 1944 Home Show.

M. L. Lavorgna

Feature of the show was a demonstration of the conversion of a single family home to a two-unit dwelling, with heating given a new emphasis.

• •

A. N. Bedell has been appointed chief engineer of Graver Tank & Mfg. Co., Inc., in charge of all engineering and development covering all divisions of the company.

Formerly associated with Max B. Miller & Co., Inc., and for 14 years in charge of engineering for that company, Mr. Bedell has had experience in the construction of refinery equipment, supplemented by previous experience in the chemical, power, sugar and general industrial fields.

Mr. Bedell's headquarters will be at the general offices of the company located at East Chicago, Ind.

• •

Frank L. Hallock, who was with Consolidated Edison Co. of New York, Inc., and its system companies for 33 years, retired on May 1.

Mr. Hallock has for many years been concerned with supervisory training and employee customer relations. Several years ago he developed such training programs for the Consolidated Edison System, and when he retired he was in charge of district offices and customer service telephone divisions and of the employee training programs for the commercial relations department, with the title of system commercial manager.

Mr. Hallock received the highest award of the gas industry, the Charles A. Munroe Award, in 1935 for his work in improving customer-employee relations.

Mr. Hallock served as chairman of committees in the commercial and accounting sections of the American Gas and National Electric Light associations.

• •

A new stock transfer office in Dallas was recently opened by the Lone Star Gas Co. with **O. B. Custer,** former office manager at El Paso, in charge. The office will issue stock certificates and transfers and will house all records of stock of the new Lone Star Gas Co. created by the recent dissolution of the Lone Star Gas Corp.

• •

LeRoy M. Edwards, vice president and general manager, Pacific Lighting Corp., was one of 80 businessmen from 40 states taking the orientation course of the army's command and general staff school at Fort Leavenworth, Kan.

• •

Lawrence J. Evans, for eight years district manager, Public Service Co. of Indiana at Wabash, Ind., has been named assistant division manager. He took charge of this newly created office on May 1.

• •

The War Department has announced that **Clarence L. Hewitt, Jr.,** formerly eastern

War!

DEMANDS

CAREFUL REGULATION OF NECESSARY MATERIAL

H-M Low Pressure Regulator
Sizes from ⅜" to 2"

H-M THERMO CONTROL REGULATOR CO.

Engineers have met this demand in producing this H-M Low Pressure Gas Regulator.

H-M Regulator controls gas economically and efficiently reduces trouble and expense.

All Sizes Are Still Available

H-M REGULATOR COMPANY
THERMO CONTROL CO.
800 EAST 108 STREET • LOS ANGELES, CALIFORNIA

American Stove Company's post-war plans

TODAY the American Stove Company is using every bit of its capacity in war production. Our engineers and skilled workers, every unit of our personnel—all are giving their utmost in the great struggle for Victory. Top salesmen are in factories, some sales managers are foremen in production departments. Day and night our men and women are working ceaselessly, doing back-breaking and heart-breaking jobs which a few short months ago seemed impossible.

Peace Plans Blue-Printed

But in the midst of the noise and turmoil of battle, American Stove Company is not forgetting its Victory Day responsibility. Long before Pearl Harbor new plans were being laid; never since that day have they ceased or slackened.

ON MARCH 10th Mr. S. E. Little, Vice President in Charge of Sales, took precious time out to call his Planning Committee together in Cleveland for a two-day discussion of this important subject. He found the members of this committee well prepared with answers to a host of problems. Concrete plans were laid out, blue-printed and reduced to writing.

NO MAN CAN TELL when this war will end. It is, therefore, apparent that no plans can be made with any specific date on the calendar as a starting point. We do know the starting point is the day after Victory Day. Our plans are being laid on that basis. The blue-prints cover a six months' period after the war's close, a six months' period after that and a twelve months' period after that. The things which will need to be done, and which can be done in the way of development, production and sales in each of these periods were carefully studied and laid.

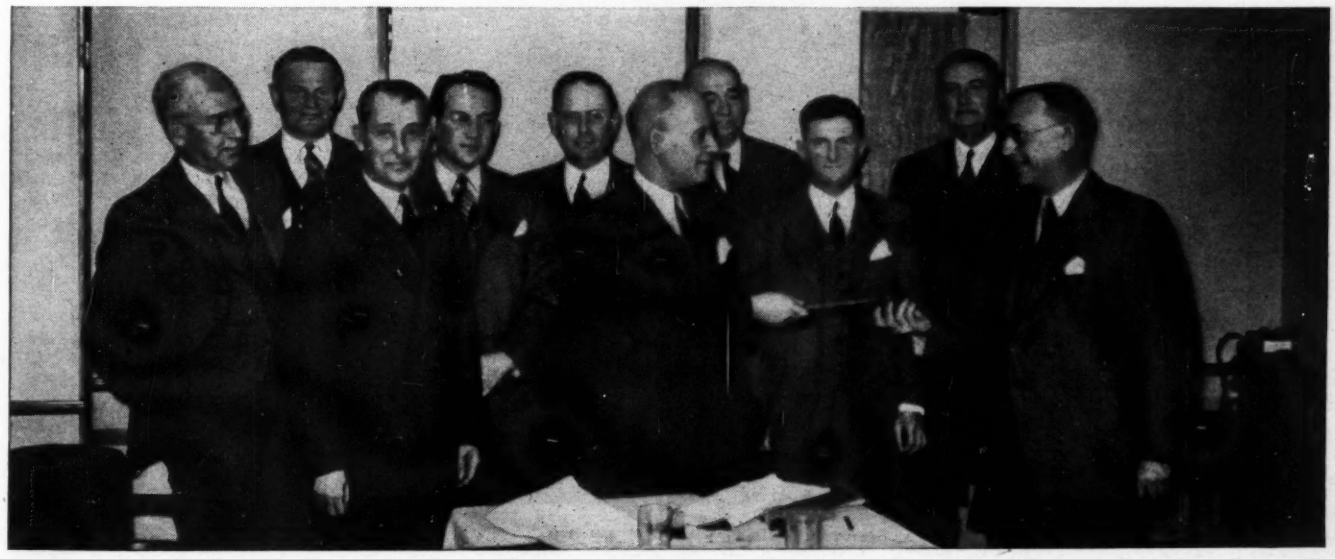
No Fumbling on Victory Day

There will be no fumbling in American Stove Company on Victory Day. The engineers, plant managers, and sales managers will brush off the seats of their pants, take a long breath and sigh with relief as they say to themselves, "Well, that big job is over." Then they'll reach in the top drawer, pull out their plans and get busy on the big job ahead.

OUR PLANNERS are not foolish enough to think it will be that easy. A good General maps out a well laid plan of campaign but he knows it will never be followed to the letter. He knows that he must follow his army into the field and revise his plans daily, hourly, and momentarily as the contingencies of battle change. Our planners are doing the same. Periodically they get together and keep their plans up to the minute. Many changes may have to be made. But on Victory Day there will be no hesitation. At that time the plans will be complete up to that day. On that day our plans will go into immediate operation.

THE RED WHEEL GAS RANGE WITH THE LIFETIME BURNER GUARANTEE

American Stove Company's Planning Committee at one of their meetings in Cleveland, March 10th and 11th to discuss post-war plans.



AMERICAN STOVE COMPANY, 4301 PERKINS AVENUE, CLEVELAND, OHIO

NEW YORK . . . CLEVELAND . . . ATLANTA . . . LOS ANGELES . . . CHICAGO . . . SAN FRANCISCO . . . SEATTLE . . . PHILADELPHIA . . . ST. LOUIS

district sales manager for the L. J. Mueller Furnace Co., Milwaukee, Wis., has been promoted to the rank of lieutenant colonel. He is the commanding officer of the Rattlesnake bomber base at Pyote, Texas.

• •

Jesse G. Tooker, new business manager, The Gas Service Co. in Wichita, and **Jack Torbert,** manager, new business department, The Wyandotte County Gas Co., Kansas City, Kan., exchanged positions on May 1, it has been announced by **B. C. Adams,** president of both companies.

Mr. Tooker has been a member of the Cities Service organization for 28 years, while Mr. Torbert has been employed in gas sales work since 1923. Mr. Tooker has, for the past two years, been chairman of the national house heating committee of the Residential Section of the American Gas Association. He is also a member of the post-war planning committee of that section.

Mr. Torbert, an active AGA member, has been serving as a member of the national water heating committee.

• •

Russell W. Aul, superintendent of transportation and assistant secretary, Jersey Central Power & Light Co., Asbury, Park, N. J., was elected secretary at the annual meeting of stockholders. Mr. Aul began his work in the utility industry with the old Consolidated Gas Co., which was later consolidated with Jersey Central.

• •

L. B. Denning, Jr., operating manager for Lone Star's general division of distribution, has announced that **Fernie F. McEwin,** formerly located at the Hillsboro district, has been appointed subdistrict manager at Groesbeck, succeeding **E. W. Alexander,** resigned.

• •

A. E. Higgins

A. E. Higgins, vice president, Pittsburgh Equitable Meter Co. and Merco Nordstrom Valve Co., was commissioned a major in the United States Air Corps on May 8, according to an announcement by **R. S. Reed, Jr.,** advertising manager of the Pittsburgh Equitable Meter Co.

Major Higgins has been assigned as second in command of the air base at Palm Springs, Calif. He is a veteran of World War 1, qualifying as an army air pilot in 1918. He now has a total of over 6000 solo hours to his credit.

Major Higgins is well known in American Gas Association activities, having served for many years as secretary of the Natural Gas section of that organization.

J. D. Creveling, president, Panhandle Eastern Pipe Line Co., has resigned to open private offices in Chicago as a natural gas and public utility consultant.

Mr. Creveling has been chief executive of Panhandle since 1936, prior to which he was in charge of the natural gas and gasoline operations for the Cities Service Co. in New York. He is a former president of the Natural Gas Association of America and is an active member of the American Gas Association and the American Petroleum Institute.

In his new offices at 135 S. La Salle St., Chicago, Mr. Creveling will have as associates other nationally known authorities from natural gas and public utility fields.

• •

D. W. Meyer, formerly associated with **Ralph E. Davis** of Pittsburgh, has joined the staff of the American Appraisal Co. Mr. Meyer has had extensive experience in gas, natural resources, and public utility investigations.

• •

Claude S. Slocum has been recently appointed factory representative for General Controls, Glendale, Calif., manufacturers of pressure, temperature and flow controls. He will serve the Rocky Mountain territory as well as Kansas City, Mo., and will also work through the Panhandle section of Texas and northern New Mexico. His new headquarters will be located at 2135 South Adams St., Denver.

Claude S. Slocum

For the past three years Mr. Slocum has been Colorado distributor for the General Controls line. Prior to that he was service manager for Tidmore Engineering Co., Tucson, Ariz. Later he organized the firm of Means & Slocum, specialists in warm air heating.

• •

Consolidated Edison Co. of New York, Inc., recently retired a number of its veteran employees. Among those retiring with distinguished service records are:

Hines H. Himsworth, assistant manager, gas production department, who has a 35-year service record. He started with the company in 1908 as superintendent's assistant, and it was in September of 1942 that he was appointed assistant manager of gas production.

Thaddeus S. Barlow, superintendent, Astoria plant, had worked for the company and its predecessors for 45 years. He entered the company as a clerk in 1897, went to Astoria as superintendent of water gas in 1935 ,and was later appointed superintendent of the Astoria plant.

John J. Bielen, mechanic, gas holder operations, had devoted 41 years of his business career to Consolidated. **W. J. MacDaniels,** commercial manager, had also been with the company 41 years.

Nathaniel J. Sperling, general superintendent, Astoria plant, retired after 38 years of service. **John Andrejchak,** foreman and gas holder engineer, substation operations, gas holder division, is a veteran of 44 years with Consolidated Edison.

• •

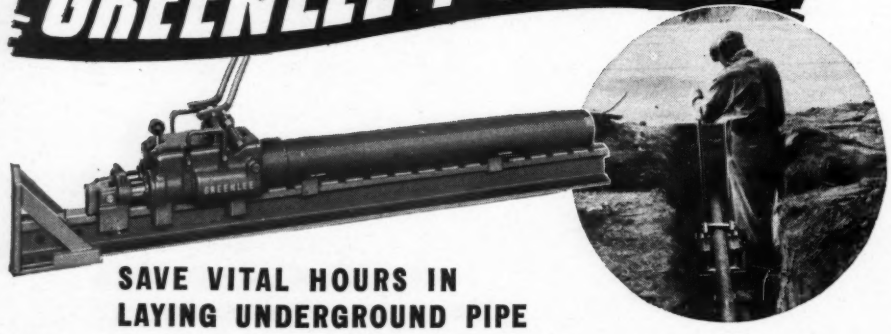
Ralph D. Williams has resigned as plant superintendent of Hudson Valley Fuel Corp., a subsidiary of Niagara Hudson Power Corp., at Troy, N. Y., to become technical consultant with the General Chemical Co., 40 Rector St., New York City.

For several years Mr. Williams has been a member of the gas production committee of the American Gas Association, serving as chairman of the carbonization and coke subcommittee in 1941-42.

• •

The staff of the American Gas Association Laboratories now has three feminine members. **Gertrude Kable,** previously employed by the Central Illinois Light Co. at Peoria,

GREENLEE PUSHERS



SAVE VITAL HOURS IN LAYING UNDERGROUND PIPE

Today when every minute counts, you can save vital hours in laying underground pipe by using a Greenlee Hydraulic Pipe Pusher. There's no time wasted in digging extensive trenches, no pavement cutting, no tunneling, no back filling, or repaving. Only a short trench is dug to accommodate the pusher and pipe. No extra power equipment of any type is required . . . the powerful hydraulic units do the job. And the *savings in labor will pay for the Greenlee Pusher* often on the first or second job. The No. 790 Greenlee, with a 20-ton hydraulic unit will push 1¼" to 4" pipe. The No. 795 Pusher with a 75-ton unit will handle large drainage ducts, concrete sewer pipe, and other pipe beyond 4".

One Man Can Operate

One or two men pumping the handles can easily develop power to push pipe under sidewalks, streets, highways, embankments, and railroad tracks. Greenlee Pushers are rugged and powerful enough to stand long gruelling service, yet they are compactly built into one unit and are easily carried to the job and set up. With these fast, powerful pushers you can lay more pipe with less manpower and cut labor costs on every job.

Send for PUSHER BULLETIN S-117

GREENLEE TOOL CO.
1945 COLUMBIA AVE., ROCKFORD, ILL.

We Pay Tribute...
to the Gas Industry

For Its Confidence in America's Heritage

To the great Gas Industry, for the courage, vision, and confidence in the future so convincingly demonstrated at the recent Gas Conferences in Cincinnati, we pay high tribute.

As manufacturers of Quality Gas Appliances, it has been our privilege for over forty years to work side by side with members of the Industry. Throughout these many years of pleasant association, we have found the Gas Industry to be dominated by a single idea — SERVICE TO THE PUBLIC. It is not surprising that these true Public Servants of the Nation are serving so gloriously and well in this National Emergency.

REMEMBER A HUMPHREY PRODUCT THIS MARK OF QUALITY

GENERAL GAS LIGHT COMPANY

KALAMAZOO, MICHIGAN

23 Warren St., New York City | 2nd Unit Santa Fe Bldg., Dallas | 225 Eleventh St., San Francisco

Cleared for ACTION

Gas Industry of the West Meets War Emergency With Fast Teamwork

Streamlining its activities in keeping with the fast pace of today, the P. C. G. A. has now substituted frequent, compact invitational committee meetings for its regular annual Convention.

LICKING WARTIME PROBLEMS

Among the subjects on which experience and ideas already have been exchanged are:

Manpower • Priorities
Dehydration of Vegetables
Nutrition (Home Service)
Utilization • Accounting
Dealer Cooperation
Production (including a report to the OCD on dim-out cooperation.)

Such meetings can be called on short notice, to discuss any problem that may arise.

THE PACIFIC COAST GAS ASSOCIATION

SERVING THE WEST - IN WAR AND PEACE

GAS FUEL

Ill., as home service representative, was the first woman to join the AGA research staff. **Mrs. Paul Lawrence,** second feminine addition, was formerly employed by the Industrial Rayon Corp. of Cleveland.

Gertrude Henry, third and most recent recruit for the AGA Laboratories, had been extension specialist in household equipment on the staff of the College of Home Economics, Cornell University.

• •

E. J. Strickland, sales promotion engineer, Southern California Gas Co., Los Angeles, and **Harry M. Evans,** supervisor of sales, Southern California Gas Co.'s eastern division, have resigned to accept new positions. Mr. Strickland, who has been with the California organization for 12 years, has entered the manufacturing business for himself, and Mr. Evans has joined the staff of the Fluor Corp., Los Angeles.

Obituaries

Joseph W. Hays

Joseph Weller Hays, the first man to be known as a "combustion engineer" and founder of what is now The Hays Corp., died at the family home in Grinnell, Iowa, April 22, at the age of 75.

Born in Chester Township, Paweshiek County, Iowa, Nov. 12, 1868, Mr. Hays attended the nearby country school and later Grinnell College Academy and Cornell College at Mt. Vernon, Iowa, from which he was graduated in 1890. He intended to make journalism his life work, but a visit to the world's Columbian Exposition at Chicago in 1893 changed his mind.

He took an absorbing interest in smoke abatement and combustion efficiency, and soon produced fuel savers and waste detectors in many forms. Among the first was an improved portable flue gas analyzer or orsat. Later came a CO_2 recorder for which Mr. Hays and his brother, Charles, were awarded a certificate of merit by the Franklin Institute of Philadelphia.

After disposing of his manufacturing business, Mr. Hays devoted his time to consulting work and writing. He re-wrote "How to Build Up Furnace Efficiency," which is now in its 18th edition. He also wrote the Hays Correspondence Course in Combustion Efficiency which is still being offered by The Hays Institute of Chicago.

He was signally honored on May 9, 1941, by the Chicago Section, American Society of Mechanical Engineers, at a testimonial dinner at which he was presented with an illuminated scroll for "Public Service in Developing the Science of Fuel Combustion and Fuel Economy and for Promoting Its Study."

■ ■

Herbert B. Maynard

Herbert B. Maynard, assistant secretary, Iowa Public Service Co., Waterloo, Iowa, died March 23 at the age of 84. He had been associated with the Waterloo company for 37 years and was one of the old-timers in the gas industry.

Mr. Maynard first became connected with the utility business as head of the Ottumwa Gas Light, Heat & Power Co. Prior to that time he had spent 14 years as railroad construction and maintenance engineer in the southern states. He was at one time manager of the South Shore Gas Co., Hammond, Ind., and went to Waterloo when the Citizens Gas & Electric Co. there was purchased by the Dawes brothers.

He was president of the Dubuque Traction & Electric Co. between 1917 and 1918 and in 1923 was president of the Iowa District Gas Association, now known as the Mid-West Gas Association.

■ ■

Angus MacArthur

Angus MasArthur, 54, vice president and director of Koppers Co., Pittsburgh, Pa., and general manager of its gas and coke division, with headquarters in New York, died suddenly May 9 in his home at Old Greenwich, Conn., following a heart attack.

He had been associated with Koppers since 1920, when he joined the organization as operating engineer. He was promoted to his latest position in 1933 and was transferred from Pittsburgh to New York in 1939.

Previous to joining the Koppers organization he was engaged in engineering work for firms in Superior, Wis., and Chicago, and was associated with the Minneapolis Gas Light Co. and the Laclede Gas Light Co.

Mr. MacArthur was born in Duluth, Minn., Nov. 29, 1888, and was graduated from the University of Wisconsin in 1911.

He was president and a director of the Connecticut Coke Co., New Haven, and the Philadelphia Coke Co., Philadelphia; vice president and trustee of Eastern Gas & Fuel Associates, Boston; and director of the Montreal Coke & Manufacturing Co., Montreal, Canada, and the Brooklyn Borough Gas Co., Brooklyn, N. Y.

■ ■

Allan C. Balch

Allan C. Balch, 79, one of the founders and a director of Southern California Gas Co., Los Angeles, passed away in that city on Friday, April 30, after a lengthy illness.

Born in Valley Falls, N. Y., in 1864, he graduated from Cornell University in 1889, and in the same year began his professional engineering career in Seattle. He worked in the utility field in Washington for several years and then moved to California, where he has since resided. He assisted in the development of the San Gabriel Light & Power Co. and in the organization of the San Joaquin Light & Power Co., and was particularly well known for his numerous philanthropies.

■ ■

K. S. Gray

K. S. Gray, northwestern division sales manager for Detroit-Michigan Stove Co., died April 15. The death occurred in San Diego, Calif., where Mr. Gray was visiting his son, a marine corps aviator. He was 54 years old and was born in Philadelphia.

Much of Mr. Gray's life was spent in the West. He had been with Detroit-Michigan Stove Co. for the past nine years, starting as a representative in Kansas and Missouri, and was given charge of sales for several states in the northwest in 1940. Prior to his work with the Detroit-Michigan Stove Co., Mr. Gray was engaged in the wholesale furniture and kitchen cabinet business in various sections of the United States.

■ ■

W. Walter Fenelon

W. Walter Fenelon, purchasing agent, Central Illinois Light Co., Peoria, Ill., died at his home on May 9 following an illness of several months. He first joined the utility company in 1909 as a clerk.

■ ■

H. R. Broker

H. R. Broker, gas superintendent, Wisconsin Gas & Electric Co., Racine, died suddenly April 24. Mr. Broker, who was 46 years old, was an active member of the Wisconsin Utilities Association and was chairman of the gas section in 1928.

FIRING AWAY

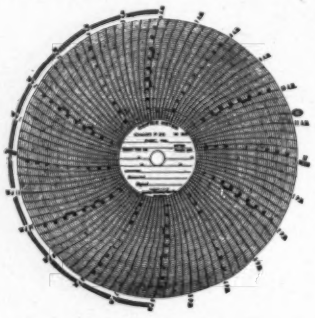
More production is the order of the day. Men and machines work on, while guns, tanks, ships, planes, ammunition become the tools of war. This is a vital part of our Nation's program for Victory. It enables our armed forces to thunder their powerful message to the enemy on the world's fighting fronts. Behind this mighty task, providing boundless, unfailing energy for our industries, are Natural Gas and Electricity—master servants which perform their appointed wartime duties silently, effectively, continuously . .

★
1500

Yes, Columbia System is enlisted for the duration. Already 1500 of its employees have relinquished varied peacetime duties to join the colors.

COLUMBIA GAS & ELECTRIC
CORPORATION

What Good Are Your Recording Instruments Without CHARTS



Prompt, Advance Deliveries of

ARCCO CHARTS

Will Keep Them Running!

You can't afford the risk of weeks of delay in receiving supplies of recording charts. Even a few hours without charts would upset your record keeping.

What is the answer?

Get your charts from American Recording Chart Company. Approximately 2 million charts are carried in stock at all times so that your orders can be shipped to you within 48 hours. Our complete manufacturing facilities enable us to produce charts which are not regularly stocked, but for which we have plates, within three days. Plates for special charts can be made by our own engraving department, and the charts printed in a short time.

ARCCO Charts are made for practically all makes of recording instruments using circular charts, in a complete range of graduations. Future supply is assured, for we have the special paper for many millions of Arcco Charts in our air-conditioned storage rooms.

Send For List Of ARCCO CHARTS

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3113 E. 11th St., Los Angeles, Calif.

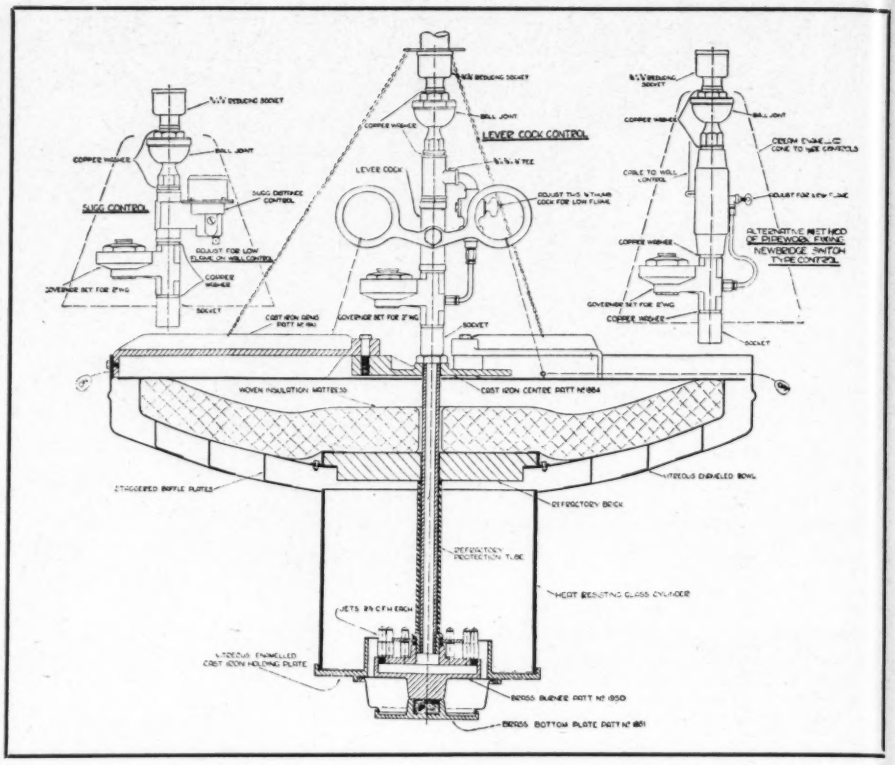


FIG. 1. Assembly drawing for Golden Glow suspension heater.

An Overhead Heater Used in England

REPRINTED from "Gas Times," March 6, 1943, published by Hallows & Slaughter, Ltd., at 29 Grove Road, Leighton Buzzard, England.

IN recent years the gas industry has solved a long-standing problem in space heating through the introduction of the overhead radiant heater. In many cases heaters of any sort on the floor are out of the question owing to the operations taking place, and their effect is localized by fixed obstructions such as machines, desks, counters, and so on.

The overhead type of radiant heater not only overcomes all those difficulties in a simple manner, but it is effective on a minimum fuel consumption and in quick time owing to the fact that it warms the individual rather than the building.

One very successful type of such overhead heater is the "Golden Glow," the external appearance of which is familiar to many. The sectional drawing (Fig. 1) shows the mechanism of this heater and is self-explanatory. The woven asbestos mattress prevents loss by upward radiation and the refractory disc serves the dual purpose of guard for the mattress and anti-condensation device.

Many thousands of these heaters are in use and the number grows daily; one medium sized gas undertaking has a consumption of 1½ million cu. ft. of gas a day through this type of overhead heater. The "Golden Glow" is made by the firm of Arthur Docking & Co. at Radiant Works, Barnsbury Park, London, N. I, and is one of a range of radiant heaters made by this firm.

■ ■

CNGA Revisions to TS-351 Now Available

Revisions for "Procedure for the Charcoal Test for the Determination of the Gasoline Content of Natural Gas" are now available to California Natural Gasoline Association members and others interested. Revised pages are 4, 5, 6 and 7 of section 1 and page 40 of appendix V, together with page 7a of section 1 and the new added appendix IX, "Field Method for Determining the Air Content of Wet Gases Under Vacuum" for Bulletin TS-351 (Third Edition).

Cost of the sets of revisions is 50¢ and they may be obtained by phoning or writing to George L. Tyler, Secretary, C. N. G. A., 510 W. Sixth St., Room 1232, Los Angeles. Phone VAndike 5521.

■ ■

Southern Counties Gas Co. Franchise Approved

At a municipal election on April 5, citizens of San Luis Obispo, Calif., approved the granting of a franchise to the Southern Counties Gas Co. to operate in that community. The proposition received a 3½ to 1 marginal approval at the polls.

The company had made application for this franchise shortly after acquiring the properties of the former Santa Maria Gas Co. in November, 1941.

ARMY
E
NAVY
The Men Behind the Flag
Work for
The Men Behind the Gun
● The men and women of Roper have been signally honored by the presentation of the Army-Navy Production Award significant of quantity and quality of war production.
Each Roper employee is proudly wearing the "E" pin as recognition of his or her achievement in giving a mighty lift to our fighting men.
But the story just begins there. Roper men and women accept this award with a sacred pledge in their hearts to increase and intensify their efforts so the forces of tyranny will be stamped out and our boys can be brought home to a victorious America where the rights of free men will always live.
GEO. D. ROPER CORPORATION, ROCKFORD, ILL.
BUY WAR BONDS NOW!
★ ★ ★
PEACETIME MANUFACTURERS OF THE ROPER GAS RANGE
GEO. D. ROPER
CORPORATION
Roper Gas Ranges For All Type Gases Including (LP) Liquefied Petroleum Gas

PRODUCTS

Fuse-Bond Equipment

Metallizing Engineering Co., Inc., Long Island City, N. Y.

Model: Fuse-Bond Process and Metco Fuse-Bond Unit.

Application: Whereby machine components and similar metal parts now may be prepared for metallizing electrically. Main advantage of the process, according to the manufacturer, is that it affords an adequate bond on the hardest surfaces, heretofore impossible or impractical to prepare by blasting or rough threading. It also simplifies preparation of narrow edges, flat areas and cylindrical parts having keyways, and other interruptions in their surfaces.

Description: Operating on any 110 or 220 volt, single phase power line, the Metco Fuse-Bond unit fuses a rough deposit of electrode metals into the surface to be metallized.

The Fuse-Bond unit is compact and is contained in a cabinet measuring only 24 in. high. Weight complete is but 170 lb. All cables and attachments fit into a bin in the top of the cabinet. Mounted on casters, it can be wheeled right to the job.

■ ■

Respirator

H. S. Cover, South Bend, Ind.

Model: Chemical Cartridge Respirator No. 10.

Application: For nuisance gases and light concentrations of organic vapors. This is not a gas mask but provides protection from paint and lacquer sprays, chemical fumes, smoke, etc.

Description: This respirator is equipped with new design chemical cartridges made of colored plastics. These new plastic cartridges replace metal and cardboard types, and are more sturdy and therefore won't crush or spill contents, according to the manufacturer. The non-corrosive cartridges are easily disassembled to replace filter pads.

A molded rubber face piece gives air-tight fit, and an adjustable headband holds respirator firmly in place. It does not interfere with vision or spectacles. Double cartridges give wearer double protection and double breathing comfort. The chemical cartridge can be supplied in white, black or yellow plastic according to the specific job for which the wearer will be using the respirator.

■ ■

Electronic Level Controls

Photoswitch Incorporated, Cambridge, Mass.

Models: Types P 15NHX and P 15NLX.

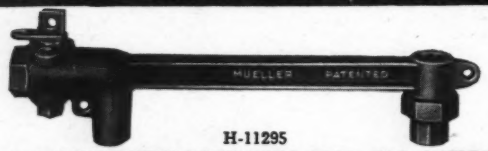
Application: These new electronic level controls are designed particularly for hazardous location mounting. They are available for high and low level control.

Description: Each type is furnished as a complete unit in a vapor-proof cast iron housing for direct tank installation. A one-inch nipple screws into the hub at the bottom of the control housing and is screwed into a one-inch flange on top of the tank. From the control, a probe rod projects through the nipple and into the tank to the desired depth. The probe is supplied as standard in one-half inch diameter brass. Other metals are also available if required.

High level control is accomplished when liquid rises and contacts the probe tip; low level control, when liquid drops below the probe tip. Both models incorporate a safety feature providing for operation of the relay in case of current or tube failure.

The relay connections of Types P15NHX and P 15NLX are those of a single-pole double-throw switch. The relay contacts are rated at 1000 w. A. C. and may govern in the output signal lights, pump motors, etc. Both these types are available for operation on 230, 208 or 115 v. A. C. 60 cycles.

PROTECTS METERS FROM STRAIN



H-11295
END INLET WITH LOCK WING STOP—TOP OUTLET

By means of the PATENTED Bevel Connector the supply pipes are forced into axial alignment. Meter tubes are protected from strain, and threads are braced and shielded from rust. There are only two threaded joints—no gaskets—no union joints. . . MUELLER Meter Bars save you time and money, speed installations, and by preventing sagging pipes and tilting, assure accurate registration of your meters. . . Stock up NOW while we have them.

MUELLER CO. DEPT. G-17. DECATUR, ILL. • LOS ANGELES, CALIF.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

STRICTLY CLASS 1-A

When the Army got one look at the Spencer Snap-Acting Disc . . . the actuating element of Klixon Automatic Gas Controls . . . they simply said, "We want you . . . you're strictly Class 1-A." So Spencer Discs are now being used for the many types of Klixon Controls that the Army needs for airplanes, tanks, trucks, etc. Consequently, Klixon Gas Controls of the types you want may not be available for the duration.

KLIXON

SPENCER THERMOSTAT COMPANY • Attleboro, Massachusetts

Catalogs

• International Acetylene Association, 30 East 42nd St., New York, N. Y., has prepared a new book on welding training. Purpose of the 88-page book is to assist instructors in planning courses for the training of oxy-acetylene welding and cutting operations. Title of the book is: "Training Oxy-Acetylene Welding and Cutting Operations — Instructors Outlines." It is divided into three chapters. The first outlines the essential information that should be presented in a course for the training of a general welding operator. The second chapter contains in outline form the material that is essential to the training of various types of cutting operators. The third chapter outlines the essential information that should be given in a course for inspectors and a specification of the primary requirements of students who take the inspector's course. Copies of the book may be obtained by writing the secretary of the association.

■ ■

• The Bristol Co., Waterbury, Conn., has just published a series of bulletins covering automatic control and recording instruments for industrial furnaces, dryers, kilns, and ovens. They have been bound together in loose leaf form in order that additions and revisions may be easily inserted. The binder set covers pyrometer recorders and con rollers, thermometer recorders and controllers, humidity recorders and controllers, draft controllers, control valves and accessories. The bulletins are well illustrated with photographs, application drawings, and wiring diagrams.

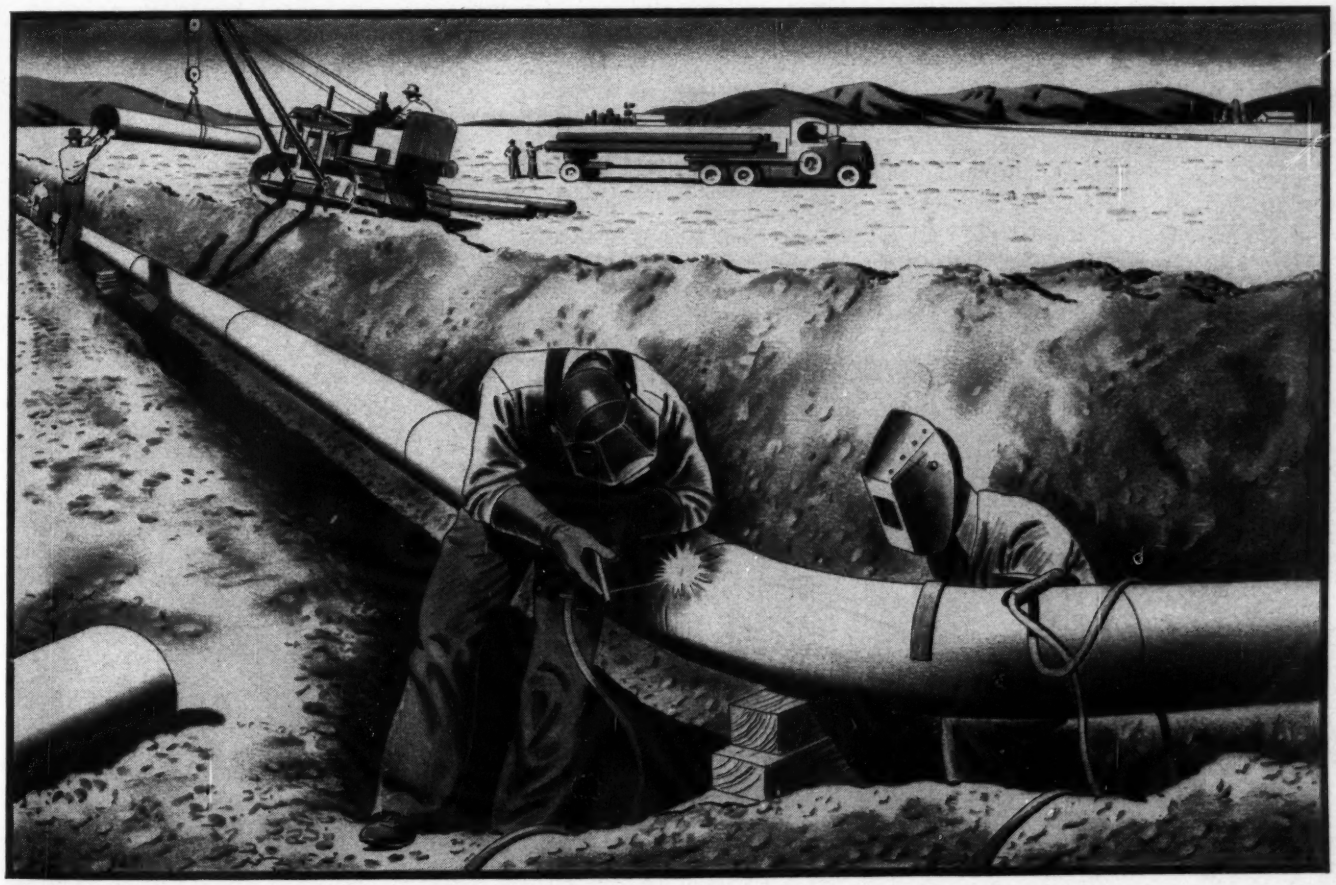
THEY FEED THE FURNACES OF WAR

An army of Natural Gas Workers
on the job 24 hours a day

WHEN PEARL HARBOR plunged the United States into war, this utility company was prepared. No mobilization orders were necessary. Our men, already working at full capacity, were ready. And among these non-military forces, trained by years of experience, one mighty important division is composed of the Gas Workers. They are men from many skilled crafts—engineers, chemists, gas technicians, compressor operators, pipe fitters and layers, trench machine drivers. Their job is a big one. They must maintain a system of thousands of miles of transmission and distribution pipe lines, through which natural gas from the oil and gas fields of Central and Northern California is carried. They must deliver a constant flow of gas to the war plants in this extensive territory – to the steel furnaces, the shipyards, the cement plants, the shops and factories where production requires efficient heat. Millions of cubic feet also must be supplied for the making of metallic magnesium. At the same time, the Gas Workers must maintain service to the cooking ranges and the heaters of 600,000 homes and supply other fuel needs of some 3,000,000 people. They are doing all this, laboring day and night, worthily carrying their share of the fight for Victory.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY



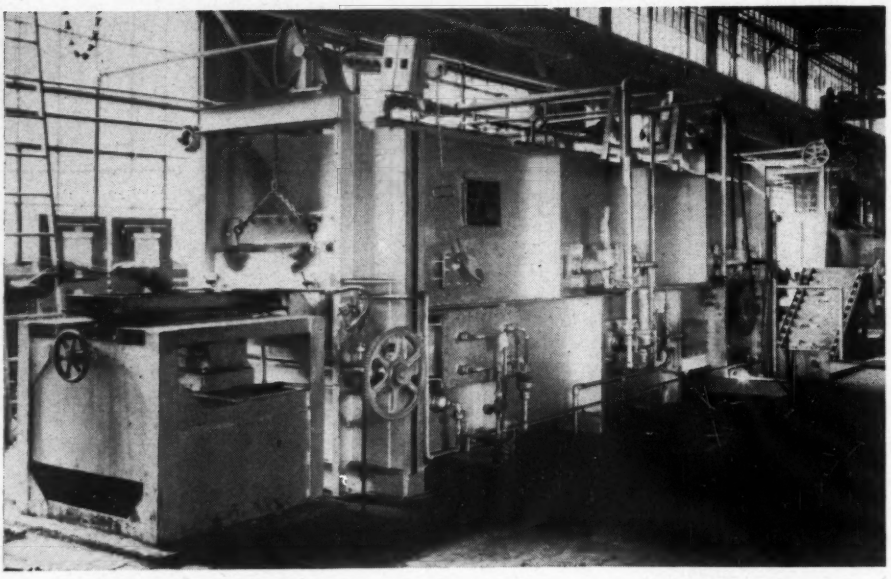


FIG. 1. Continuous hardening furnace for treatment of chain and chain products.

Gas Heat Treating At Link-Belt Co.

AS the trend of the times has made the science of Heat Treating more and more exacting, alert management has taken advantage of new developments in methods and equipment, and has sought constantly to improve the quality and durability of their goods.

Such is the case at the Link-Belt Co., Indianapolis, Ind., where Link-Belt chains and chain products are manufactured. Link-Belt Co. has been one of the pioneers in heat-treating. From the early days of oil-fired hand controlled furnaces to the present day of efficient gas heating with automatic temperature control and controlled atmosphere, they have steadily adopted proven equipment and have done much toward the development of new methods and equipment.

Until about 1924, furnace heating was done mainly with fuel oil and manual regulation. About that time the possibilities of automatic furnaces were installed. This new and unique installation revealed many possibilities and it was the subject of several magazine articles and plant visits. Gas firing made it possible to load the furnaces with larger heats. Furnace design and a new quenching system made possible more efficient handling of work. Automatic recording temperature control produced full regulation, maintained uniform temperatures and eliminated much of the variations due to hand control.

The performance of this installation soon influenced further improvement in heat treating. Additional new

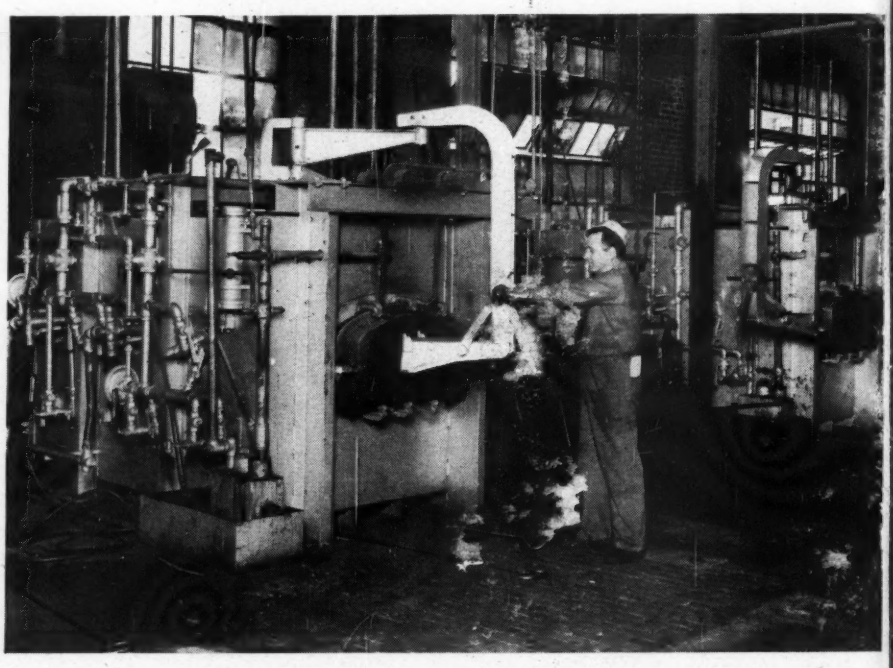


FIG. 2. Batch type carburizing furnace for treatment of chain sprockets and other parts.

units were installed and old oil-fired units replaced which increased the total number to several times the original installation.

Following this, new types of continuous hardening furnaces were installed. Spiral type continuous rotary furnaces with atmosphere control are hardening small chain links, and a larger size is used for hardening larger chain parts. A cast alloy belt type, continuous furnace with controlled atmosphere, heated with radiant tubes, is used to harden still larger chain parts.

An improved type of cyanide pot furnace was installed for heat treating chain parts in cyanide and liquid car-

SEMET-SOLVAY
ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
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Gas Purifiers
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40 RECTOR STREET, NEW YORK, N. Y.

burizer. New batch type gas carburizers were added which greatly increased the production of heat-treated chain sprockets. Still following the trend, all the oven type furnaces which had been oil-fired were rebuilt and fired with gas, automatically controlled. Forging furnaces were redesigned and rebuilt and gas firing equipment put on them.

In all this equipment, the outstanding performers are probably the cast belt continuous hardening furnace and the batch type gas carburizers.

The continuous hardening furnace, as pictured in Fig 1, is heated with radiant tubes. No alloy retort is necessary since the refractory lining of the furnace serves that purpose. The one exposed opening is at the charging end where the work is loaded on the belt by a shaker hearth type loader. The discharge is inside the furnace and the work falls off the belt through a chute submerged in quenching oil to a conveyor where it is elevated and discharged into barrels. A prepared gas is introduced into the furnace which exhausts at the charging end, maintaining a uniform atmosphere throughout and giving heat-treated parts with no scale or decarburization and preserving hole and pitch dimensions necessary for chain manufacture.

The batch type carburizer, also pictured in Fig 2, does away with heavy boxes and solid compounds. Into a heated muffle is loaded the work to be carburized and a prepared gas is circulated around it. Denser loads, more efficient handling and less fuel consumption is accomplished and a fine and uniform grade of carburizing is done.

In this persistent move toward better things, the availability of a good fuel has had its influence on the selection of the equipment which has kept the heat treating operations modern and efficient. The flexibility, the response to regulation, the ease with which changes and adjustments can be made have all contributed to the trend toward gas.

■ ■

Florida Pipeline Progress

Between 28,000 and 30,000 bbl. of gasoline will be flowing through the trans-Florida pipeline by June, Petroleum Administrator for War Harold L. Ickes predicted May 4.

Some 16,000 bbl. a day are expected to be flowing from Carabelle, on the Gulf Coast, to Jacksonville, on the Atlantic Coast by the end of May.

United Gas Pipe Line Rate Case Settled

The Federal Power Commission on April 20 announced its order accepting new rate schedules filed by the United Gas Pipe Line Co., Shreveport, La., which reduce wholesale rates for natural gas sold by United Gas Pipe Line to other pipeline companies and distributing companies in Alabama, Florida, Louisiana, Mississippi and Texas by $2,195,287 a year based on 1942 sales. The commission ordered that the new rate schedules shall take effect on and after either March 20, March 26, April 1 or April 10, according to the company's established billing periods.

The new rates will reduce the cost of gas to pipeline companies which transport and resell the gas at the city gates of St. Louis, Memphis, Birmingham, Atlanta and other cities, and to 45 distributing companies serving 265 communities having an aggregate population in excess of 2,500,000, including San Antonio, New Orleans, Wichita Falls, Austin, Beaumont, Jackson, Mobile, Houston and Pensacola.

■ ■

Study of Absenteeism

Results of an extensive study by the division of labor standards of the United States Department of Labor of methods of combating absenteeism in war plants have been published in booklet form.

The pamphlet, "Controlling Absenteeism," sets forth the experiences of management in dealing with absenteeism in some 200 war plants. Copies of the publication may be obtained on request to the Division of Labor Standards, United States Department of Labor, Washington, D. C.

"CLEVELANDS"---

Unsurpassed for:

Main Line
Field Line
and Distribution } DITCHING

STRIPPING PIPE for { Reconditioning and Take-Up

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. "Pioneer of the Small Trencher" CLEVELAND, OHIO
"CLEVELANDS" Save More . . . Because they Do More

Consulting Engineers and Manufacturers

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THE
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Gas Combustion and Control Equipment

Division of
SURFACE COMBUSTION
TOLEDO, OHIO

DOING THEIR *Duty*

TRADE **K-CO** MARK

Gas Stops—Top Relief Valves—Automatic
Gas Shut-off Valves — Meter Connections.

KITSON COMPANY
1500 Walnut St., Phila., Pa.

Subsidiary of the WELSBACH ENGINEERING & MANAGEMENT CORPORATION

New Method for Dealing With PAW Law Violators

STREAMLINING of action against those who violate orders, directives or regulations of the Petroleum Administration for War was announced April 28 by Petroleum Administrator for War Harold L. Ickes.

Simplification of the system for investigating and establishing procedures for determining violations of PAW orders has been effected by Office Administrative Order No. 2. Explaining the procedure of this new order, Administrator Ickes said:

"A non-compliance proceeding is started with a letter from the Compliance Section in PAW, outlining the known facts to the company or operator who, it is believed, has violated a Petroleum Administrator order, directive or regulation.

"The company or operator can reply in writing or may elect to present the facts at a conference before a commissioner appointed by PAW.

"If a conference is requested, the commissioner listens to the presentation of facts and then prepares for the Compliance Section a report of such facts. The company or operator is given a copy of this report and has the right to make any reply necessary.

"When all facts or arguments are thus presented, the entire matter is submitted to an assistant petroleum administrator, who reviews the file and makes a recommendation to the petroleum administrator or the deputy petroleum administrator.

"If it is determined that no violation exists the company or operator is notified immediately. If a violation has in fact been committed, an appropriate suspension or enforcement order is issued by the petroleum administrator or the deputy petroleum administrator."

This order may contain one of the following penalties:

1. Withdrawing or withholding priorities assistance.

2. Withdrawing or withholding allocations of scarce materials.

3. Prohibiting a respondent from delivering, receiving, using or otherwise dealing in specified scarce materials or products.

4. Such provision which may be found necessary and appropriate to accomplish the purpose of the executive order creating the Petroleum Administration for War.

DOTTED LINE ROSCOE . . . by Pvt. Bob Crosby

"It's the boss—first time Roscoe ever had him where he wanted him."

Let's STAY on the JOB - Servelians!
And if our lines should form and break
Because of things you failed to make -
The extra tank or ship or plane
For which we waited all in vain,
And the supplies that never came
Will you then come and take the blame?
For we, not you, will pay the cost
Of battles you, not we, have lost.

The harm caused by absenteeism is brought to the attention of employees in the war production plant of Servel, Inc., Evansville, Ind., where 250 of these posters are displayed in key positions. The poster shows a machine gunner killed in the line of duty because his supply of ammunition ran out.

Peoples Gas Co. Tank Rammed By Army Plane

An attempted landing in unfavorable weather caused a B-24 bomber with 12 crew members to crash through the steel wall of the world's largest gas holder at the plant of the Peoples Gas, Light and Coke Co., Chicago on May 20. All members of the crew were killed instantly.

The bomber, from the Ft. Worth (Tex.) army airfield was attempting a landing at the municipal airport when witnesses saw it crash with terrific impact into the steel tank. Flames from the burning container soared 350 ft. into the air.

The 500 ft. holder has a capacity of 18,000,000 cu. ft. of gas. The plane was inside the tank when it caught fire, Charles Anderson, foreman of the Peoples Gas, Light and Coke Co. said.

■ ■

Booklet Issued as Guide To War Agency Activities

The Office of War Information has just issued a booklet as a guide to federal agencies currently devoted to the war activities. The title of the publication is "Handbook to Emergency War Agencies," and it is designed to help the public reach the services it needs within the emergency war agencies.

This booklet does not include the activities of the agencies established for other purposes, even though much of their work today has been integrated with the war program.

Copies of the handbook may be obtained by writing to the Superintendent of Documents, Government Printing Office, Washington, D. C. Price is 20¢ each.

■ ■

War Department Honors AGA Laboratories

The American Gas Association Testing Laboratories have been placed by the War Department on its Quality Control Classification "A" list. This denotes complete approval and is the highest classification bestowed. Under its provisions, full responsibility is entrusted to the Laboratories in determining that the products they are delivering to the War Department meet all requirements established by it. This award, based on demonstrated performance, is noteworthy in view of the comparatively short time in which the Laboratories have been engaged in direct war work.

Under a recent ruling of the War Manpower Commission, employees of the Testing Laboratories are now considered as working in "essential" employment. This action was taken in connection with the Cleveland Employment Stabilization Plan shortly followed announcement of the establishment of a 48-hour work week in the Cleveland area. This ruling of the War Manpower Commission is expected to be helpful in future operations.

Increase in Gas Utility Accident Rate Shown

The accident rate in the gas utility industry has increased during the past nine months, according to the latest bulletin issued by the National Safety Council, Inc. Figures in the public utility safety contest show the gas division to have an increased average frequency rate of 10%. The combination gas and electric division frequency rate has decreased by 11% for 1942 showing, and the electric division has shown an accident decrease of 11%.

The Electric Power Board, Nashville, Tenn., is still holding the best no-injury record in the contest to date.

Save { GAS, MANPOWER, CRITICAL MATERIALS, TIME, MONEY }

with Carboseal Anti-Leak

Carboseal Anti-Leak saves gas by stopping leaks in the bell-and-spigot joints of dry-gas systems. The liquid compound swells the joint packing and stops the leaks. Reductions of 100 per cent in joint leakage are common. Reports show that joints in mains treated seven years ago are still tight.

Carboseal Anti-Leak saves manpower in two ways. First, only a small crew is required to apply it. And, second, service calls due to dust trouble are reduced, because the Anti-Leak thoroughly wets the main and lays the dust.

Carboseal Anti-Leak saves critical materials, largely eliminating the steel and rubber necessary for other methods of leakage control.

Carboseal Anti-Leak saves time. Its application by gravity flow inside the mains requires an average of four filling connections to the main per mile—excavation and repaving are almost eliminated.

Carboseal Anti-Leak saves money. The average cost of the Anti-Leak treatment is about 50 cents per joint, a fraction of the cost of leakage correction by other means.

For additional information, write for the book, "Correcting Leakage in Gas Distribution Systems with CARBOSEAL Anti-Leak."

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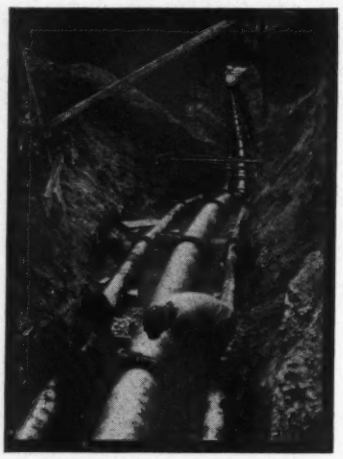
replace substitute pipe with time-tested Mono-Cast Centrifugal Pipe. Manufactured according to the recently adopted A. S. A. Law of Design or other specifications.



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MILWAUKEE WISCONSIN

Gas Measurement Short Course Postponed

THE Southwestern Gas Measurement Short Course meeting for 1943 will not be held due to conditions arising from the war, the general committee announced through Kate A. Niblack, chairman of the registration and publicity committee.

In a four-page printed folder issued by the College of Engineering, University of Oklahoma, Norman, Okla., the following statement is included: "The Southwestern Gas Measurement Short Course is one of the leading institutions through which information related to all phases of gas measurement is disseminated to all concerned. The members of the general committee had hoped that the course could be held this year, and from the number of inquiries received, a large attendance could be expected, nevertheless, after due consideration given to all things involved it was decided to cancel the 1943 school. The general committee will function as in the past and publish reports submitted by the committee for the study of practical methods."

The pamphlet deals largely with a history of the school, which was organized in 1924 and grew from an enrollment of 60 to 727 at the 1941 school. During the 19 years the school has been in existence, 823 operating companies have sent 9697 representatives.

■ ■

Oklahoma Commission Expands Its Authority

The Oklahoma Corporation Commission expanded its authority over conservation of natural gas production on May 5, when it issued an order providing regulations and standards for ratable-taking in the Guymon sector of the Hugoton gas field.

This vast gas-producing reserve extends through the central half of Texas County, Okla., into seven counties of Kansas. Several large natural gas transmission lines extend into and through sections of this field to carry fuel to several cities of Kansas, Missouri and other states.

Oklahoma has a statute, on the books since 1913, which authorizes it to pro-rate the taking of gas, limiting production to 25% of potentials, but no definite and uniform standards governing the taking of these tests had been set prior to the issuance of the May 5 order.

The Kansas Corporation Commission previously had issued an order regulating the taking of gas from the Kansas sector of the field. The Oklahoma commission studied this order and held several joint sessions with the Kansas commission to hear statements and evidence bearing on the subject.

The Oklahoma order fixes 640 acres as a drainage unit and provides that deliverability shall also be a factor in the amount of gas each well shall be permitted to take from the field each day.

Of 380 wells in the Hugoton field, about 60 have never had a pipeline outlet. Kansas has 329 wells with an estimated flow capacity of 3.5 billion cu. ft. daily. Oklahoma has 52 producers with a total estimated flow of 825,000,000 cu. ft. daily. On the Kansas side wells have been cut back to 2% of potential, while on the Oklahoma side production up to 25% of potentials has been permitted where there was a sufficient market demand. Officials of both states will make an effort to secure a greater uniformity of taking of gas in relation to production and marketability.

■ ■

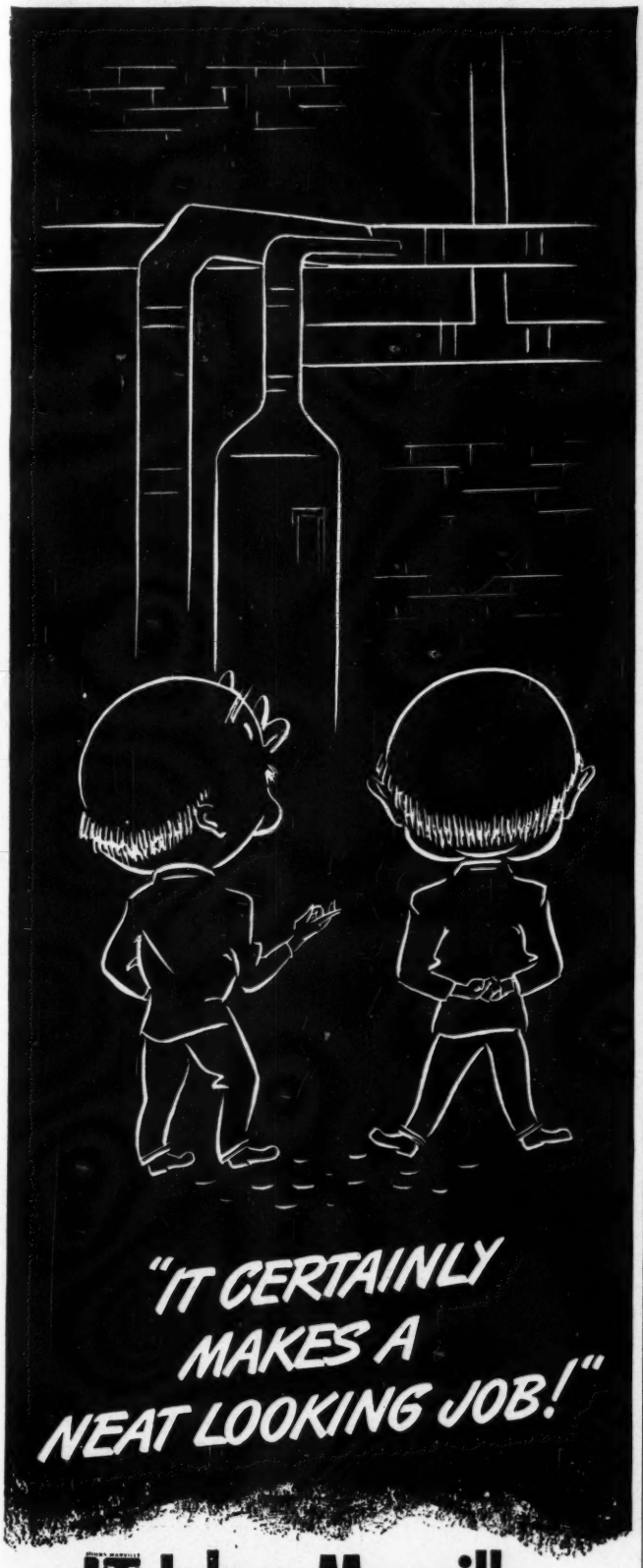
Booklet on Duties of Home Service in Wartime

A little booklet entitled "Wartime Home Service" has been prepared by the home service committee of the residential section of the American Gas Association. It shows that the home service departments of the gas companies are truly leaders in community activities in the promotion of wartime programs of nutrition, equipment, fuel and food conservation.

The story of how these home service departments have made 12,000,000 contacts in 1942 is told within the pages of the 20-page booklet. Susan Mack, home service director, Boston Consolidated Gas Co., was chairman of the sub-committee in charge of compiling and setting up the data for the booklet.

Extra copies of the booklet can be had from the American Gas Association, 420 Lexington Ave., New York.

"Fashions in Rations," the new Saturday morning radio show sponsored by Servel, Inc., has had its premiere. Pictured at the recent opening in CBS's New York studio are: Nancy Hamilton, author of the script; Davis M. De Bard of Stone & Webster, New York; Billie Burke, star of the production; and Eugene A. Sommer, president of the Gas & Electric Co. at Palma de Mallorca, Spain.



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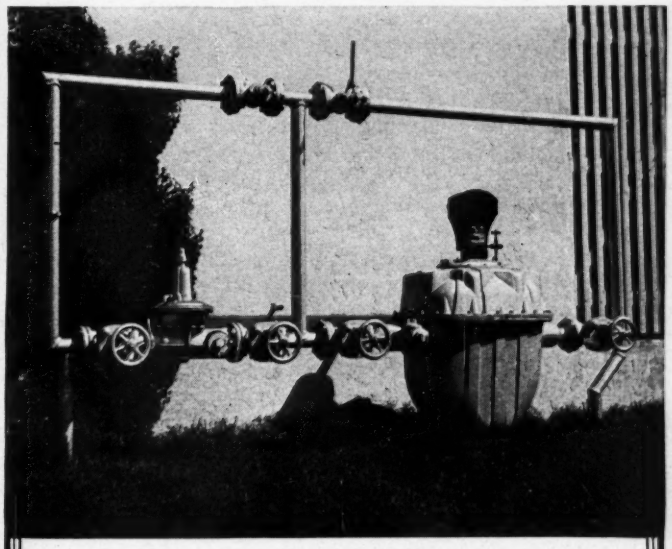

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West Cement Shut in for Field Tests

THE West Cement gas field in Caddo County, Okla., was ordered shut in for a period of 14 days, beginning May 18, by the Oklahoma Corporation Commission, following a hearing on May 13. The shut-down of the wells, which produce from the Madrano sand and supply 15% to 20% of the industrial consumption in Oklahoma, Kansas and Missouri, was requested through E. Holley Poe, director, Natural Gas and Gasoline Division, PAW, and by Seth W. Herndon, Tulsa, in charge of that department for district No. 2.

At the hearing, Walker T. Pound, conservation officer of the Oklahoma Commission, recommended the shut-down as the best method he knew of to make tests to determine just how much natural gas is in the field, the probable longevity of the area and whether production of gas at rates which have prevailed will endanger or destroy oil production in the field which has been discovered in a well brought in recently in the south end of the district by the Magnolia Petroleum Co. The tests are to be made by engineers of the U. S. Bureau of Mines, aided by representatives of the conservation department of the Oklahoma Corporation Commission.

Cities Service Gas Co. is the largest purchaser of gas from the field with nominations of 82,000,000 cu. ft. daily for the month of May. A representative of that company at the hearing stated that his company at that time did not know where it could obtain a supplemental supply of gas to meet its current market demands for the month unless the PAW issued directives and enforced deliveries from other sources. Even in that event, the representative stated, less than 25,000,000 cu. ft. per day could be delivered from sources which could be connected to the lines of his company. He stated that his company supplies gas to large war industries in Oklahoma, Kansas and Missouri and if the field were shut down, his company would either have to draw from its storage and endanger service for next winter or obtain gas from other pipeline companies under PAW.

Oklahoma Natural Gas Co. is the second largest purchaser from the West Cement field, supplying a greater portion of the domestic consumers in Oklahoma and some defense and industrial areas in the state.

How to supply consumers of gas during the two weeks shut-down is a problem for the gas companies and not for the commission, W. A. Armstrong, commission member, advised attendants at the hearing. "The commission is not in a position to protect you in your source of supply for the consumers," he said. The chief function of the commission in this case is to cooperate with federal authorities to conserve the supply and prevent undue waste of gas and oil in the district, and to accomplish this, the shut-down method offers the best known means of determining pressures and other factors which must be known before a proper conservation policy can be determined for the field, Mr. Armstrong indicated.

■ ■

Procedures for Foremen Outlined in NAM Booklet

The National Association of Manufacturers has made public a "check-sheet" of recommended procedures in the supervisory field which it urges management to follow in order to build sound management-supervisory relations.

The procedures are outlined in a 16-page pamphlet entitled "The Foreman, the Key Man in Your Plant." In announcing this pamphlet, C. Donald Dallas, president of Revere Copper & Brass Co., New York City, and chairman of NAM's industrial relations policy committee, stated that it was the result of an extensive study by a special subcommittee appointed for that purpose.

Copies of the pamphlet may be obtained by writing to the National Association of Manufacturers, 14 West 49th St., New York.

New Pipeline May Bring Crude Oil to Midwest

THE construction of a large pipeline to provide Middle Western refineries with additional supplies of West Texas crude oil is now under study by the Petroleum Administration for War, Harold L. Ickes has announced. Pointing out that crude oil reserves in Mid-continent fields are declining, Administrator Ickes said:

"As a consequence, Middle Western refineries will ultimately have to be supplied with crude oil from more distant sources, and the problem may become acute before the end of 1944.

"In the face of that prospect, a pipeline from a central point in the West Texas field —one of the last substantially untapped crude oil reserves presently known in the Southwest—to a point of connection with existing pipelines that serve the Middle Western refining districts must be given serious consideration.

"The long-range plans of the Petroleum Administration have embraced a study of the possible construction features of such a pipeline. Recently a specific proposal from a private company has been received for the construction of a 16-in. pipeline from near Lubbock, Texas, to the vicinity of Drumright, Okla., to connect with existing pipelines that feed the Middle Western refining centers.

"The proposed project, with a capacity of from 54,000 to 116,000 bbl. per day, depending upon the number of pump stations installed, is receiving careful study, from the standpoints of petroleum economics, transportation necessities, and engineering, by the transportation division of the Petroleum Administration for War.

"A decision on this specific proposal and the basic need for such a pipeline will be made when these studies have been completed and when the 1944-1945 crude oil requirements of the Middle Western refineries have been adequately clarified."

According to Deputy Petroleum Administrator Ralph K. Davies, the pipeline proposal submitted to the Petroleum Administration for War calls for the private financing of approximately 383 miles of new pipelines requiring a minimum expenditure of 42,645 tons of steel and approximately $7,000,000.

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Gas Companies Contribute Second War Loan Drive

The U. S. Treasury's "Second War Loan Drive" received immediate and fruitful support from the Southern California Gas Co. and the Southern Counties Gas Co., both of Los Angeles. The former company purchased $1,092,000 in bonds, while the latter invested $500,000 in bonds. The bonds were bought through banks in the various counties served by the companies, and in that way each local community war bond committee could apply a portion of the amounts toward its county quota.

According to F. S. Wade, president of both companies, the funds invested in the bonds were originally set aside for additions, betterments and other capital expenditures which priority limitations and critical materials shortage make impossible to carry through.

■ ■

Radio Fact Sheet Issued

A war emergency radio service fact sheet has been issued by the U. S. Office of Civilian Defense, Washington, D. C. It gives essential information on an important protection aid made available for defense forces jointly by the Office of Civilian Defense and the Federal Communications Commission—the War Emergency Radio Service.

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